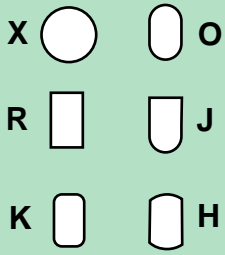


Punches

Standard Shapes



VJ ___ Jektole®



Round/Shape

2/3

VP ___ Regular Pilots



Round/Shape

4/5

VPT Regular



Regular

6/7

VPA Positive Pick-Up



Positive Pick-Up

8/9

VLX Spring Pilot



Spring Pilot

21

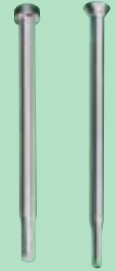
VJ ___ VP ___ Extended Range



Round/Shape

17

CloSPACE

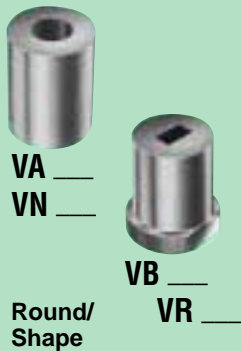


60° Square

18

Matrixes

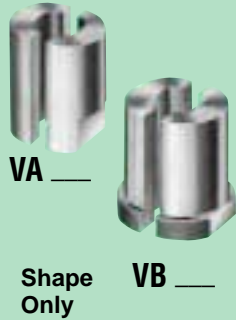
Solid



Round/Shape

12/13

Split



Shape Only

14/15

Rectangular



VSS

17

Micro

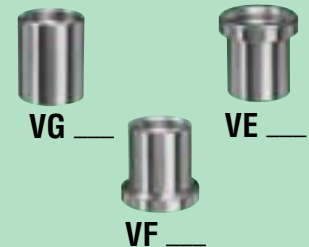


MHX

20

Bushings/Guides

Guide Bushings

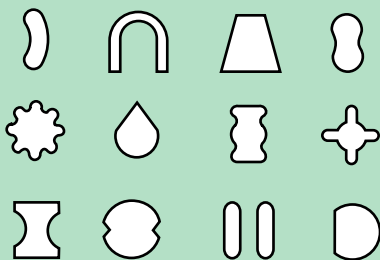


VF

16

Data

Classified Shapes/ Ordering Information



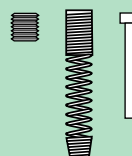
22/23

Locking Devices



24/25

Jektole® Components



26

Catalog Ordering System

Significant Catalog System

Example:

VPR Line Product Shape
37 Press-Fit Dia. D
 Coded by the first 2 digits of dec equiv (.375)
12 Shank Length
 Coded by inches and quarter-inches (1 inch and 2 quarters)
23 Overall Length L
 Coded by inches and quarter-inches (2 inches and 3 quarters)

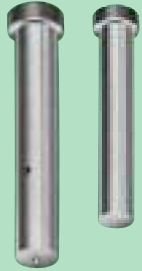
V for Versatile
 P for Punch (Regular)
 R for Rectangle

Product Series Length Point or Hole Size

VPR™ 37- 1223 P.1875,W.1325

Type Catalog Number Dimensions As Specified

VYW VUX
Straight



Jektol[®]
Regular

10

VJB VPB
Blanks



Jektol[®]
Regular

11

VMX
Misfeed
Detectors



21

Micro
Guides

MGX



MEX



MFX

20

Quill Bushings/
Guides



VQX



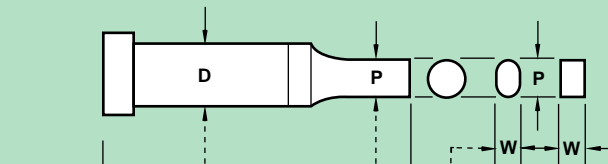
VFQ

19

Easy to Specify

The Catalog Designation completely defines the product, including shape, dimensions, tolerances, and concentricity.

How to Order Specify Qty, Type, Catalog Number, and P or P & W Dimensions



Qty. Type

5 VPR

37

1223

P.1875

W.1325

Jektol[®] Punches

Regular Punches

Regular Pilots

**Positive
Pick-Up Pilots**

**Straight Punches/
Punch Blanks**

Solid Matrixes

Split Matrixes

**Guide Bushings
Extended Range Punches
Rectangular Matrixes**

**Clospace Punches
Quill Bushings/Guides**

**Micro Guides/Matrixes
Misfeed Detectors
Spring Pilots**

Classified Shapes

Jektol[®] Punches

Precision, Press Fit Jektol Punches

- Steel: A2, M2, D2 Rc 60-63
PS Rc 63-65
- All Heads Drawn to Rc 40-55

FDS
Round 1, Shape 2 Days

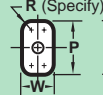


Type
VJ _____

VJH



VJK



VJJ



VJX



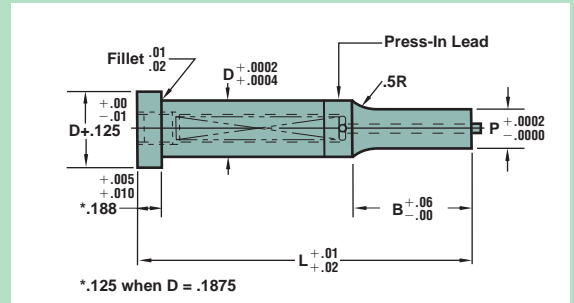
VJO



VJR



P&W Tolerance $\pm .0002$
P to D $\pm .0003$ ©



Shank		Point Length B	Round		Shape			Overall Length L							
D	Code		Min. XP	Range P	Min. XW	Min. W	Max. P/G	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00
.1875	*18	.50	.050	.062-.1874	.062	.062-	.1875	0311	1012	1113	1220	1321	2022	2123	2230
.2500	*25		.080	.093-.2499	.080	.093-	.2500								
.3125	31		.115	.125-.3124	.115	.125-	.3125								
.3750	37		.158	.187-.3749	.158	.187-	.3750								
.1875	*18	.75	.050	.062-.1874	.062	.062-	.1875	0312	1013	1120	1221	1322	2023	2130	
.2500	*25		.080	.093-.2499	.080	.093-	.2500								
.3215	31		.115	.125-.3124	.115	.125-	.3125								
.3750	37		.158	.187-.3749	.158	.187-	.3750								
.4375	43		.158	.187-.4374	.158	.187-	.4375								
.5000	50		.158	.225-.4999	.158	.250-	.5000								
.6250	62		.235	.310-.6249	.235	.282-	.6250								
.7500	75		.300	.390-.7499	.235	.312-	.7500								
1.0000	100	.400	.485-.9999	.235	.375-	1.0000									
.1875	*18	1.00	.058	.062-.1874	.093	.093-	.1875	0313	1020	1121	1222	1323	2030		
.2500	*25		.080	.093-.2499	.093	.093-	.2500								
.3125	31		.115	.125-.3124	.115	.125-	.3125								
.3750	37		.158	.187-.3749	.158	.187-	.3750								
.4375	43		.158	.187-.4374	.158	.187-	.4375								
.5000	50		.158	.225-.4999	.158	.250-	.5000								
.6250	62		.235	.310-.6249	.235	.282-	.6250								
.7500	75		.300	.390-.7499	.235	.312-	.7500								
1.0000	100	.400	.485-.9999	.235	.375-	1.0000									
.2500	*25	1.25	.080	.093-.2499	.093	.093-	.2500	0320	1021	1122	1223	1330			
.3125	31		.115	.125-.3124	.115	.125-	.3125								
.3750	37		.158	.187-.3749	.158	.187-	.3750								
.4375	43		.158	.187-.4374	.158	.187-	.4375								
.5000	50		.158	.225-.4999	.158	.250-	.5000								
.6250	62		.235	.310-.6249	.235	.282-	.6250								
.7500	75	.300	.390-.7499	.235	.312-	.7500									
1.0000	100	.400	.485-.9999	.235	.375-	1.0000									
.3125	31	1.50	.115	.125-.3124	.115	.125-	.3125	0321	1022	1123	1230				
.3750	37		.158	.187-.3749	.158	.187-	.3750								
.4375	43		.158	.187-.4374	.158	.187-	.4375								
.5000	50		.158	.225-.4999	.158	.250-	.5000								
.6250	62		.235	.310-.6249	.235	.282-	.6250								
.7500	75		.300	.390-.7499	.235	.312-	.7500								
1.0000	100	.400	.485-.9999	.235	.375-	1.0000									

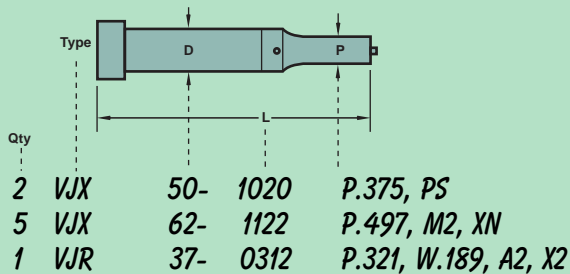
*Not available in D2

□ Sharp corners are typical. To assure proper clearance, Dayton will provide standard broken corners to eliminate interference with matrix fillet when total clearance is .005 or less.

w Check your P & W dimensions to be sure the diagonal G does not exceed the max. shown.

How to Order:

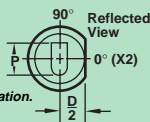
Specify: Quantity
 Type
 Shank & Length Codes
 P or P & W Dimensions
 Steel
 Standard Alterations



Key Flats

The standard location of a key flat is at 0°.

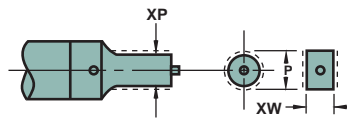
See pgs. 24 & 25 for more information.



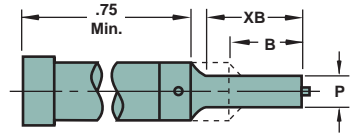
Standard Alterations

Standard alterations are the ranges beyond those sizes listed in the catalog which can be manufactured for a slight additional charge. Does not add to delivery unless noted.

XP, XW P & W Dimensions Smaller than Standard

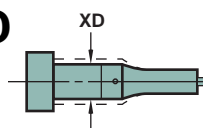


XB Point Length Longer than Standard



Point Length	.500-.750	.751-1.000	1.001-1.250	1.251-1.500	1.501-1.625	.500-.750	.751-1.000	1.001-1.250	1.251-1.500	1.501-1.625	Jektole Component
Code	Type					Type					
	Min. P (Rounds)					Min. W (Shapes)					
18	VJ_	.050	.058			.062	.093				J2
25	VJ_	.080	.080	.080		.080	.093	.093			J3
31	VJ_	.115	.115	.115	.115	.115	.115	.115	.115	.115	J4
37	VJ_	.158	.158	.158	.158	.158	.158	.158	.158	.158	J6
43	VJ_	.158	.158	.158	.158	.158	.158	.158	.158	.158	J6
50	VJ_	.158	.158	.158	.158	.158	.158	.158	.158	.158	J6
62	VJ_	.235	.235	.235	.235	.235	.235	.235	.235	.235	J9
75	VJ_	.300	.300	.300	.300	.300	.235	.235	.235	.235	J9
100	VJ_	.400	.400	.400	.400	.400	.235	.235	.235	.235	J9

XD



Reduced Shank Diameter

Head Diameter does not change with body diameter.

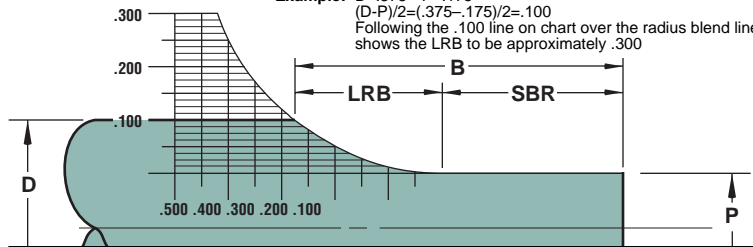
Shank Dia.	18	25	31	37	43	50	62	75	100
Min. XD	.172	.218	.282	.344	.376	.438	.562	.688	.938

SBR

Straight Before Radius

1. Calculate (D-P)/2
2. Find (D-P)/2 value on left side of chart
3. Follow line over to intersection point on radius blend line
4. Read LRB value on bottom of chart

Example: D=.375 P=.175
 $(D-P)/2 = (.375 - .175)/2 = .100$
 Following the .100 line on chart over the radius blend line shows the LRB to be approximately .300



XL

Overall Length Shortened (1.00 min.)

Stock removal from point end which shortens B length. To maintain "B" specify "XB".

LL

Precision Overall Length

Same as XL except overall length is held to ±.001.

XT

Thinner Head than Standard

Stock removal from head end which shortens overall length.

TT

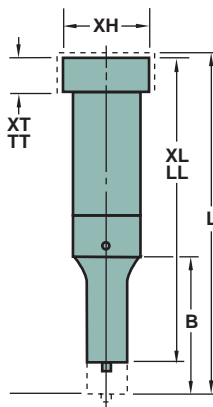
Precision Head Thickness

Same as XT except head thickness tolerance is held to ±.0005.

XH

Reduced Head Diameter

Minimum head diameter equals D+.000 - .001.



XN

DayTride® A unique wear-resistant surface treatment for M2 & PS only. + 2 Days

XNT

DAYTiN® Titanium Nitride coating for extra wear. For M2 & PS only. + 4 Days

XK

No Side Hole For air ejection. No cost.

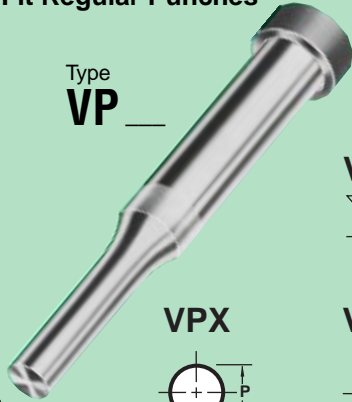
XJ

Smaller Jektole Components See page 26. + 3 Days

Code	3.25	3.50	3.75	4.00	Jektole Component
18					J2
25					J3
31	2331	3032			J4
37			3133		J6
18					J2
25					J3
31					J4
37					J6
43	2231	2332	3033		J6
50				3140	J6
62					J9
75					J9
100					J9
18					J2
25					J3
31					J4
37					J6
43	2131	2232	2333	3040	J6
50					J6
62					J9
75					J9
100					J9
25					J3
31					J4
37					J6
43	2031	2132	2233	2340	J6
50					J6
62					J9
75					J9
100					J9
31					J4
37					J6
43					J6
50	1331	2032	2133	2240	J6
62					J9
75					J9
100					J9

Regular Punches

Precision, Press Fit Regular Punches

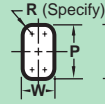


Type
VP _____

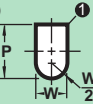
VPH



VPK



VPJ



VPX



VPO



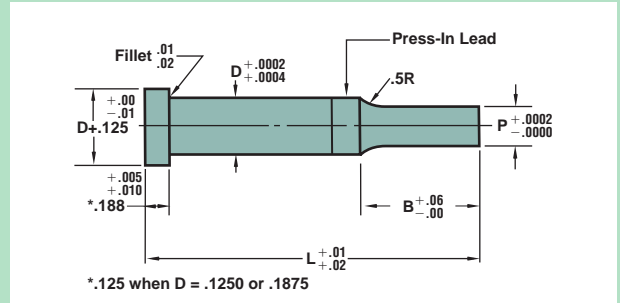
VPR



P&W Tolerance $\begin{matrix} +.0002 \\ -.0000 \end{matrix}$
P to D $\begin{matrix} +.0003 \\ \text{C} \end{matrix}$

- Steel: A2, M2, D2 Rc 60-63
PS Rc 63-65
- All Heads Drawn to Rc 40-55

FDS
Round 1, Shape 2 Days



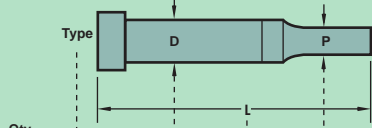
Shank		Point Length B	Round		Shape			Overall Length L							
D	Code		Min. XP	Range P	Min. XW	Min. W	Max. P/G	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00
.1250	12	.50	.031	.031-.1249	.062	.062-	.1250	0311	1012	1113	1220	1321	2022	2123	2230
.1875	18		.042	.046-.1874	.062	.062-	.1875								
.2500	25		.062	.062-.2499	.062	.062-	.2500								
.3125	31		.062	.093-.3124	.062	.093-	.3125								
.3750	37		.062	.125-.3749	.080	.125-	.3750								
.1250	12	.75	.042	.062-.1249	.062	.062-	.1250	0312	1013	1120	1221	1322	2023	2130	
.1875	18		.042	.062-.1874	.062	.062-	.1875								
.2500	25		.062	.062-.2499	.062	.062-	.2500								
.3125	31		.062	.093-.3124	.062	.093-	.3125								
.3750	37		.062	.125-.3749	.080	.125-	.3750								
.4375	43		.093	.187-.4374	.109	.187-	.4375								
.5000	50		.125	.225-.4999	.125	.187-	.5000								
.6250	62		.235	.310-.6249	.235	.250-	.6250								
.7500	75		.300	.390-.7499	.235	.312-	.7500								
1.0000	100		.400	.485-.9999	.235	.375-	1.0000								
.1250	12	1.00	.058	.062-.1249	.062	.062-	.1250	0313	1020	1121	1222	1323	2030		
.1875	18		.058	.062-.1874	.062	.062-	.1875								
.2500	25		.062	.062-.2499	.062	.062-	.2500								
.3125	31		.062	.093-.3124	.093	.093-	.3125								
.3750	37		.062	.125-.3749	.109	.125-	.3750								
.4375	43		.093	.187-.4374	.109	.187-	.4375								
.5000	50		.125	.225-.4999	.125	.187-	.5000								
.6250	62		.235	.310-.6249	.235	.250-	.6250								
.7500	75		.300	.390-.7499	.235	.312-	.7500								
1.0000	100		.400	.485-.9999	.235	.375-	1.0000								
.1250	12	1.25	.075	.093-.1249	.093	.093-	.1250	0320	1021	1122	1223	1330			
.1875	18		.075	.093-.1874	.093	.093-	.1875								
.2500	25		.080	.093-.2499	.093	.093-	.2500								
.3125	31		.093	.093-.3124	.093	.093-	.3125								
.3750	37		.093	.125-.3749	.125	.125-	.3750								
.4375	43		.093	.187-.4374	.141	.187-	.4375								
.5000	50		.125	.225-.4999	.141	.187-	.5000								
.6250	62		.235	.310-.6249	.235	.250-	.6250								
.7500	75		.300	.390-.7499	.235	.312-	.7500								
1.0000	100		.400	.485-.9999	.235	.375-	1.0000								
.1875	18	1.50	.093	.125-.1874	.125	.125-	.1875	0321	1022	1123	1230				
.2500	25		.093	.125-.2499	.125	.125-	.2500								
.3125	31		.093	.125-.3124	.125	.125-	.3125								
.3750	37		.125	.125-.3749	.125	.125-	.3750								
.4375	43		.125	.187-.4374	.172	.187-	.4375								
.5000	50		.125	.225-.4999	.172	.187-	.5000								
.6250	62		.235	.310-.6249	.235	.250-	.6250								
.7500	75		.300	.390-.7499	.235	.312-	.7500								
1.0000	100	.400	.485-.9999	.235	.375-	1.0000									

□ Sharp corners are typical. To assure proper clearance, Dayton will provide standard broken corners to eliminate interference with matrix fillet when total clearance is .005 or less.

w Check your P & W dimensions to be sure the diagonal G does not exceed the max. shown.

How to Order:

Specify: Quantity, Type
Shank & Length Codes
P or P & W Dimensions
Steel, Standard Alterations

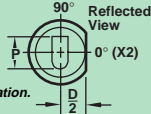


Qty 2 VPX 37- 1020 P.250, A2
6 VPJ 12- 0312 P.103, W.065, M2, XN
1 VPO 62- 2030 P.500, W.375, PS, XNT, X2

Key Flats

The standard location of a key flat is at 0°.

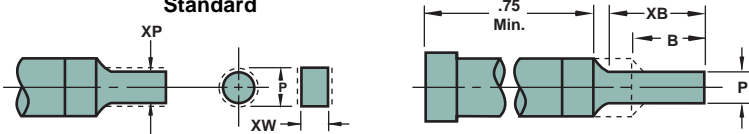
See pgs. 24 & 25 for more information.



Standard Alterations

Standard alterations are the ranges beyond those sizes listed in the catalog which can be manufactured for a slight additional charge. Does not add to delivery unless noted.

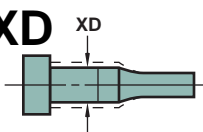
XP, XW P & W Dimensions Smaller than Standard
XB Point Length Longer than Standard



Point Length	.500-.750	.751-1.000	1.001-1.250	1.251-1.500	1.501-1.625	.500-.750	.751-1.000	1.001-1.250	1.251-1.500	1.501-1.625	
Code	Type	Min. P (Rounds)					Min. W (Shapes)				
12	VP_	.042*	.058	.075			.062	.062	.093		
18	VP_	.042	.058	.075	.093		.062	.062	.093	.125	
25	VP_	.062	.062	.080	.093		.062	.062	.093	.125	
31	VP_	.062	.062	.093	.093	.125	.062	.093	.093	.125 .195	
37	VP_	.062	.062	.093	.125	.125	.080	.109	.125	.125 .195	
43	VP_	.093	.093	.093	.125	.125	.109	.109	.141	.172 .195	
50	VP_	.125	.125	.125	.125	.125	.125	.125	.141	.172 .195	
62	VP_	.235	.235	.235	.235	.235	.235	.235	.235	.235	
75	VP_	.300	.300	.300	.300	.300	.235	.235	.235	.235	
100	VP_	.400	.400	.400	.400	.400	.235	.235	.235	.235	

*.031 for .500 B

XD



Reduced Shank Diameter

Head Diameter does not change with body diameter.

Shank Dia.	12	18	25	31	37	43	50	62	75	100
Min. XD	.063	.126	.188	.251	.313	.376	.438	.562	.688	.938

SBR

Straight Before Radius

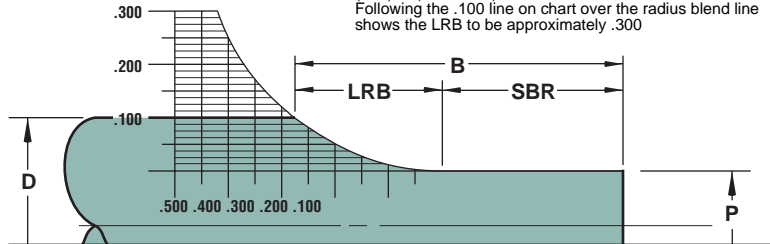
To determine Length of Radius Blend (LRB)

1. Calculate (D-P)/2
2. Find (D-P)/2 value on left side of chart
3. Follow line over to intersection point on radius blend line
4. Read LRB value on bottom of chart

Example: D=.375 P=.175

$$(D-P)/2 = (.375 - .175)/2 = .100$$

Following the .100 line on chart over the radius blend line shows the LRB to be approximately .300



XL

Overall Length Shortened (1.00 min.)

Stock removal from point end which shortens B length. To maintain "B" specify "XB".

LL

Precision Overall Length

Same as XL except overall length is held to ±.001.

XT

Thinner Head than Standard

Stock removal from head end which shortens overall length.

TT

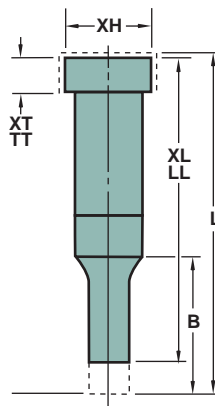
Precision Head Thickness

Same as XT except head thickness tolerance is held to ±.0005.

XH

Reduced Head Diameter

Minimum head diameter equals D+.000 - .001.



XN

DayTride® A unique wear-resistant surface treatment for M2 & PS only. + 2 Days

XNT

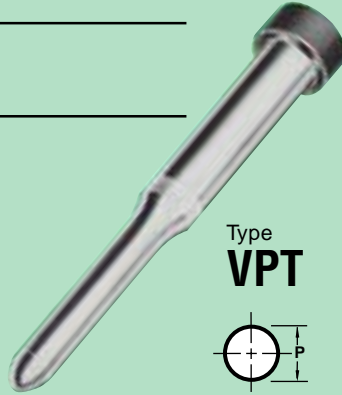
DAYTiN® Titanium Nitride coating for extra wear. For M2 & PS only. + 4 Days

	Code	3.25	3.50	3.75	4.00
	12				
	18				
	25	2331	3032		
	31			3133	3240
	37				
	12				
	18				
	25				
	31				
	37	2231	2332		
	43				
	50			3033	3140
	62				
	75				
	100				
	12				
	18				
	25				
	31				
	37	2131	2232		
	43				
	50			2333	3040
	62				
	75				
	100				
	12				
	18				
	25				
	31				
	37	2031	2132		
	43				
	50			2233	2340
	62				
	75				
	100				
	18				
	25				
	31				
	37				
	43	1331	2032		
	50				
	62			2133	2240
	75				
	100				

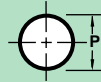
Pilots

Precision Pilots

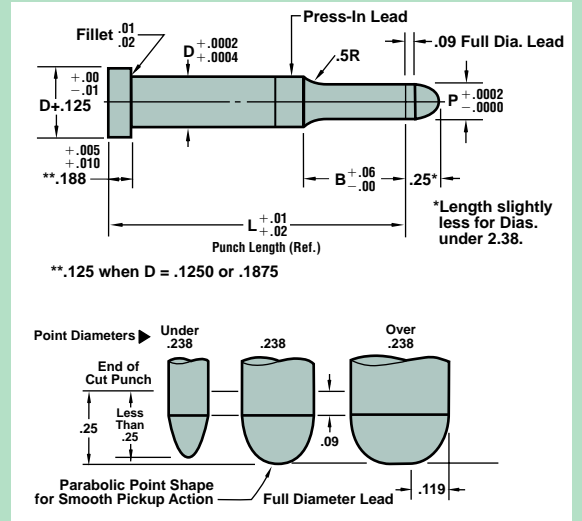
- Steel: A2, M2, Rc 60-63
PS Rc 63-65
- All Heads Drawn to Rc 40-55



Type
VPT



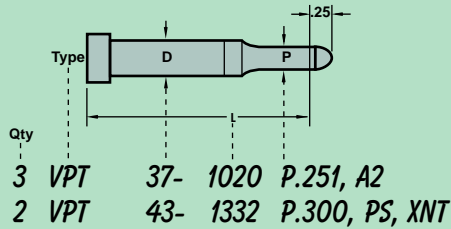
P Tolerance $\begin{matrix} +.0002 \\ -.0000 \end{matrix}$
P to D $\begin{matrix} .0003 \\ \text{C} \end{matrix}$



Shank		Point Length B	Round		Overall Length L							
D	Code		Min. XP	Range P	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00
		.50	.050	.061- .1250	0311	1012	1113	1220	1321	2022	2123	2230
.1250	12		.050	.061- .1875								
.1875	18		.061	.061- .2500								
.2500	25		.061	.092- .3125								
.3125	31		.061	.124- .3750								
.3750	37	.75	.050	.061- .1250	0312	1013	1120	1221	1322	2023	2130	
.4375	43		.050	.061- .1875								
.5000	50		.061	.061- .2500								
.6250	62		.061	.092- .3125								
.7500	75		.061	.124- .3750								
.8750	87		.092	.186- .4375								
1.0000	100		.124	.224- .5000								
		1.00	.057	.061- .1250	0313	1020	1121	1222	1323	2030		
.1250	12		.057	.061- .1875								
.1875	18		.061	.061- .2500								
.2500	25		.061	.092- .3125								
.3125	31		.061	.124- .3750								
.3750	37		.092	.186- .4375								
.4375	43		.124	.224- .5000								
		1.25	.074	.092- .1250	0320	1021	1122	1223	1330			
.1250	12		.074	.092- .1875								
.1875	18		.079	.092- .2500								
.2500	25		.092	.092- .3125								
.3125	31		.092	.124- .3750								
.3750	37		.092	.186- .4375								
.4375	43		.124	.224- .5000								
		1.50	.092	.124- .1875	0321	1022	1123	1230				
.1250	12		.092	.124- .2500								
.1875	18		.124	.124- .3750								
.2500	25		.124	.186- .4375								
.3125	31		.124	.224- .5000								
.3750	37		.234	.309- .6250								
.4375	43		.299	.389- .7500								
.5000	50	.399	.484-1.0000									
.6250	62	2.00	.092	.124- .1875	0322	1023	1124	1231				
.7500	75		.092	.124- .2500								
1.0000	100		.124	.124- .3750								
		2.25	.092	.124- .1875	0323	1024	1125	1232				
.1250	12		.092	.124- .2500								
.1875	18		.124	.124- .3750								
		2.50	.092	.124- .1875	0324	1025	1126	1233				
.1250	12		.092	.124- .2500								
.1875	18		.124	.124- .3750								
		2.75	.092	.124- .1875	0325	1026	1127	1234				
.1250	12		.092	.124- .2500								
.1875	18		.124	.124- .3750								
		3.00	.092	.124- .1875	0326	1027	1128	1235				
.1250	12		.092	.124- .2500								
.1875	18		.124	.124- .3750								

How to Order:

Specify: Quantity
 Type
 Shank & Length Codes
 P Dimension
 Steel
 Standard Alterations

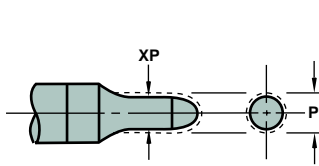


	Code	3.25	3.50	3.75	4.00
12					
18					
25		2331	3032		
31				3133	3240
37					
12					
18					
25					
31					
37		2231	2332		
43					
50				3033	3140
62					
75					
100					
12					
18					
25					
31					
37		2131	2232		
43					
50				2333	3040
62					
75					
100					
12					
18					
25					
31					
37		2031	2132		
43					
50				2233	2340
62					
75					
100					
18					
25					
31					
37					
43		1331	2032		
50					
62				2133	2240
75					
100					

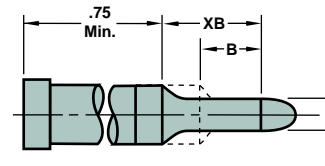
Standard Alterations

Standard alterations are the ranges beyond those sizes listed in the catalog which can be manufactured for a slight additional charge. Does not add to delivery unless noted.

XP P Dimensions Smaller than Standard

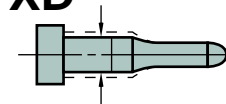


XB Point Length Longer than Standard



Point Length	.500-.750	.751-1.000	1.001-1.251	1.251-1.501	1.501-1.625	
Code						
Type						
	Min. P (Rounds)					
12	VPT	.050	.057	.074		
18	VPT	.050	.057	.074	.092	
25	VPT	.061	.061	.079	.092	
31	VPT	.061	.061	.092	.092	.124
37	VPT	.061	.061	.092	.124	.124
43	VPT	.092	.092	.092	.124	.124
50	VPT	.124	.124	.124	.124	.124
62	VPT	.234	.234	.234	.234	.234
75	VPT	.299	.299	.299	.299	.299
100	VPT	.399	.399	.399	.399	.399

XD Reduced Shank Diameter



Head Diameter does not change with body diameter.

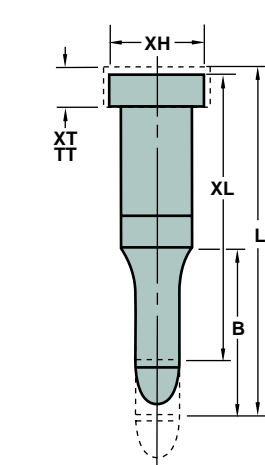
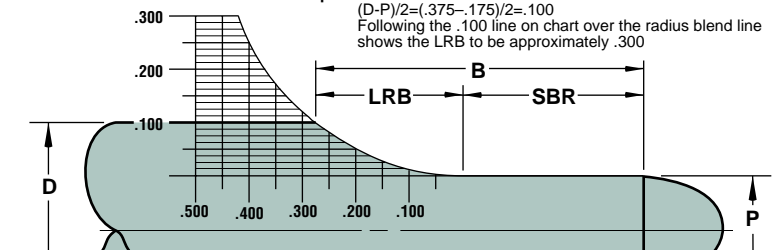
Shank Dia.	12	18	25	31	37	43	50	62	75	100
Min. XD	.063	.126	.188	.251	.313	.376	.438	.562	.688	.938

SBR

Straight Before Radius

- To determine Length of Radius Blend (LRB)
1. Calculate (D-P)/2
 2. Find (D-P)/2 value on left side of chart
 3. Follow line over to intersection point on radius blend line
 4. Read LRB value on bottom of chart

Example: D=.375 P=.175
 $(D-P)/2 = (.375 - .175)/2 = .100$
 Following the .100 line on chart over the radius blend line shows the LRB to be approximately .300



XL Overall Length Shortened (1.00 min.)

Stock removal from point end which shortens B length. To maintain "B" specify "XB".

XT Thinner Head than Standard

Stock removal from head end which shortens overall length.

TT Precision Head Thickness

Same as XT except head thickness tolerance is held to $\pm .0005$.

XH Reduced Head Diameter

Minimum head diameter equals $D + .000 - .001$.

XN DayTride® A unique wear-resistant surface treatment for M2 & PS only. **+ 2 Days**

XNT DAYTiN® Titanium Nitride coating for extra wear. For M2 & PS only. **+ 4 Days**

Positive Pick-Up Pilots

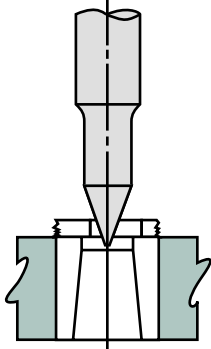
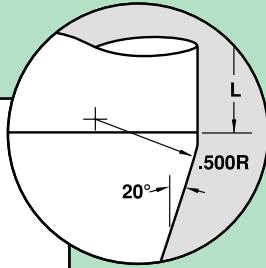
Precision Pilots

Order any length from 2.25 through 5.50*

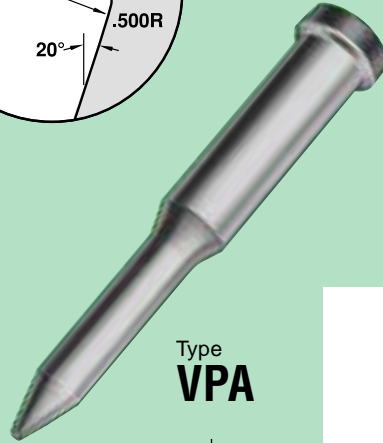
- Steel: A2, M2, Rc 60-63
- All Heads Drawn to Rc 40-55



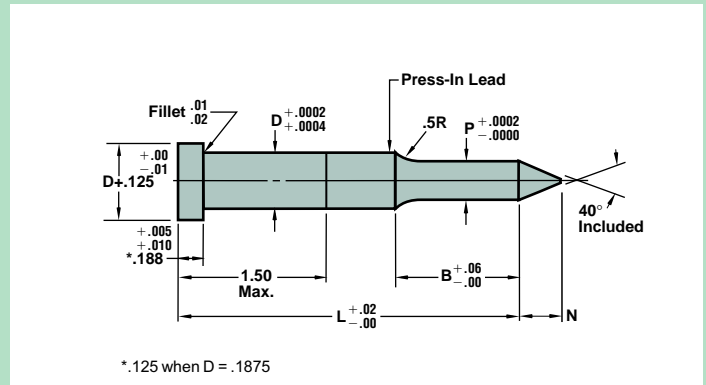
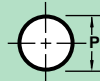
Geometry provides smoother pick up without risk of distortion of hole



Greater Positioning — moves stock further than conventional pilots



Type VPA



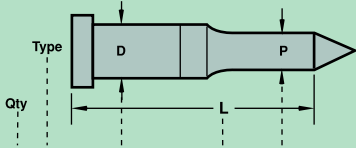
P Tolerance $\begin{matrix} +.0002 \\ -.0000 \end{matrix}$
 P to D $\begin{matrix} +.0003 \\ \text{M} \end{matrix}$
 When P = D tolerance is $\begin{matrix} +.0002 \\ +.0004 \end{matrix}$

Shank		Point Length B	Round		N	A2/M2						Overall Length L			
D	Code		Min. XP	Range P		2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	
.1875	18	.75	.050	.061-.1875	.18	1221									
.2500	25		.061	.061-.2500	.25										
.3125	31		.061	.092-.3125	.31										
.3750	37		.061	.124-.3750	.37										
.4375	43		.092	.186-.4375	.43			1322	2023	2130	2231	2332	3033	3140	
.5000	50		.124	.224-.5000	.50										
.6250	62		.234	.309-.6250	.62										3241
.7500	75		.299	.389-.7500	.75										
1.0000	100		.399	.484-1.0000	1.00										
.1875	18		1.00	.057	.061-.1875		.18	1121							
.2500	25	.061		.061-.2500	.25										
.3125	31	.061		.092-.3125	.31										
.3750	37	.061		.124-.3750	.37										
.4375	43	.092		.186-.4375	.43		1222		1323	2030	2131	2232	2333	3040	
.5000	50	.124		.224-.5000	.50										
.6250	62	.234		.309-.6250	.62										3141
.7500	75	.299		.389-.7500	.75										
1.0000	100	.399		.484-1.0000	1.00										
.1875	18	1.25		.074	.092-.1875	.18									
.2500	25		.079	.092-.2500	.25										
.3125	31		.092	.092-.3125	.31										
.3750	37		.092	.124-.3750	.37										
.4375	43		.092	.186-.4375	.43										
.5000	50		.124	.224-.5000	.50		1122	1223	1330	2031	2132	2233	2340		
.6250	62		.234	.309-.6250	.62									3041	
.7500	75		.299	.389-.7500	.75										
1.0000	100		.399	.484-1.0000	1.00										

* XL available at no charge within catalog range. Standard B length maintained.

How to Order:

- Specify: Quantity
- Type
- Shank & Length Codes
- P Dimension
- Steel
- Standard Alterations

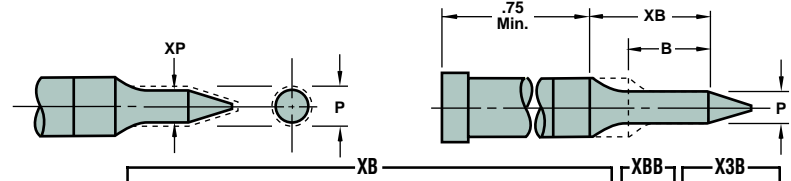


6 VPA 100- 3040 P.749, XL 3.840 M2

Standard Alterations

Standard alterations are the ranges beyond those sizes listed in the catalog which can be manufactured for a slight additional charge. Does not add to delivery unless noted.

XP P Dimensions Smaller than Standard **XB** Point Length Longer than Standard
Specify **XB**, **XBB**, or **X3B** and length (see chart below)



Point Length	.500	.626	.751	.876	1.001	1.126	1.251	1.376	1.501	1.626	2.001	2.501
	.625	.750	.875	1.000	1.125	1.250	1.375	1.500	1.625	2.000	2.500	3.000
Code Type	Min. P (Rounds)											
18 VPA	.050	.050	.057	.057	.074	.074	.092	.092				
25 VPA	.061	.061	.061	.061	.079	.079	.092	.092				
31 VPA	.061	.061	.061	.061	.092	.092	.092	.092	.124	.186		
37 VPA	.061	.061	.061	.061	.092	.092	.124	.124	.124	.186	.249	.311
43 VPA	.092	.092	.092	.092	.092	.092	.124	.124	.124	.186	.249	.311
50 VPA	.124	.124	.124	.124	.124	.124	.124	.124	.124	.186	.249	.311
62 VPA	.234	.234	.234	.234	.234	.234	.234	.234	.234	.234	.311	.374
75 VPA	.299	.299	.299	.299	.299	.299	.299	.299	.299	.299	.342	.405
100 VPA	.399	.399	.399	.399	.399	.399	.399	.399	.399	.399	.399	.436

XD XD **Reduced Shank Diameter**
Head Diameter does not change with body diameter.

Shank Dia.	37	43	50	62	75	100
Min. XD	.313	.376	.438	.562	.688	.938

SBR **Straight Before Radius**
To determine Length of Radius Blend (LRB)
1. Calculate (D-P)/2
2. Find (D-P)/2 value on left side of chart
3. Follow line over to intersection point on radius blend line
4. Read LRB value on bottom of chart

Example: D=.375 P=.175
(D-P)/2=(.375-.175)/2=.100
Following the .100 line on chart over the radius blend line shows the LRB to be approximately .300

M2 Only					
Code	4.50	4.75	5.00	5.25	5.50
18					
25					
31					
37					
43					
50					
62	3342	4043	4150	4251	4352
75					
100					
18					
25					
31					
37					
43					
50					
62	3242	3343	4050	4151	4252
75					
100					
18					
25					
31					
37					
43					
50					
62	3142	3243	3350	4051	4152
75					
100					

XL **Overall Length Shortened**
Stock removal from point end. Standard B length maintained.

XT **Thinner Head than Standard**
Stock removal from head end which shortens overall length.

TT **Precision Head Thickness**
Same as XT except head thickness tolerance is held to ± .0005.

XH **Reduced Head Diameter**
Minimum head diameter equals D+.000 - .001.

XN DayTride® A unique wear-resistant surface treatment for M2 only. + 2 Days

XNT DAYTiN® Titanium Nitride coating for extra wear. For M2 only. + 4 Days

Straight Punches

Jektole® & Regular

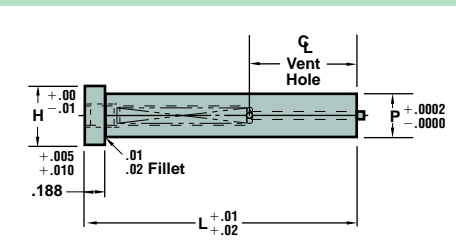
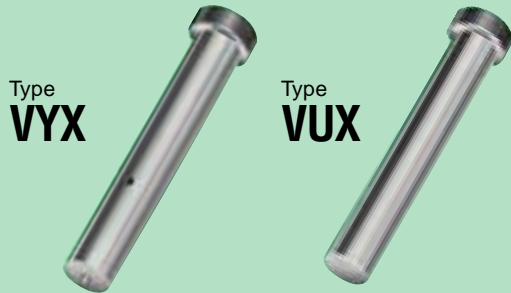
- Steel: A2, M2, Rc 60-63
- All Heads Drawn to Rc 40-55



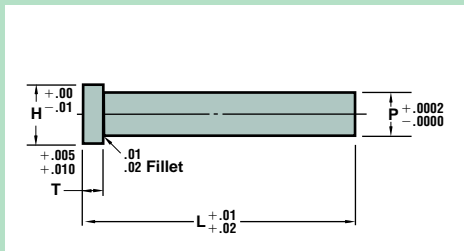
How to Order:

Specify: Quantity
Type
Length Code
P Dimension
Steel
Standard Alterations

5 VYX 250 P.324, A2
2 VUX 325 P.492, M2



VYX



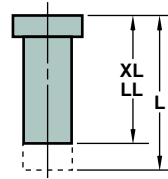
VUX



P Tolerance $\begin{matrix} +.0002 \\ -.0000 \end{matrix}$

Standard Alterations

Standard alterations are the ranges beyond those sizes listed in the catalog which can be manufactured for a slight additional charge. Does not add to delivery unless noted.

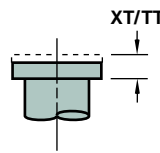


XL

Overall Length Shortened (1.00 min.)
Stock removal from point end which shortens B length.

LL

Precision Overall Length
Same as XL except overall length is held to $\pm .001$.

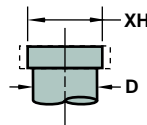


XT

Thinner Head than Standard
Stock removal from head end which shortens overall length.

TT

Precision Head Thickness
Same as XT except head thickness tolerance is held to $\pm .0005$.



XH

Reduced Head Diameter
Minimum head diameter equals $D + .000 - .001$.

XN DayTride® A unique wear-resistant surface treatment for M2 only.
+ 2 Days

XNT DAYTiN® Titanium Nitride coating for extra wear.
+ 4 Days For M2 only.

	Range P	Head Dia. H	Head Thk T	ϕ Vent Hole	Overall Length L										Jektole Component		
					1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50		3.75	4.00
VYX	.1870-.2500	.375	See DWG.	.55	125	150	175	200	225							J2	
	.2501-.3130	.438		.55	125	150	175									J3	
	.3131-.3750	.500		.80				200	225	250	275	300					J4
	.3751-.4380	.562		.60	125	150	175										J6
	.4381-.5000	.625		.85				200	225	250	275	300					J6
	.5001-.6250	.750		.85						250	275	300	325	350			
				1.10							250	275	300	325	350		
VUX	.0620-.1250	.250	.125	N/A	125	150	175	200	225	250	275	300	325	350	375	400	N/A
	.1251-.1880	.312	.125														
	.1881-.2500	.375	.188														
	.2501-.3130	.438	.188														
	.3131-.3750	.500	.188														
	.3751-.4380	.562	.188														
	.4381-.5000	.625	.188														
.5001-.6250	.750	.188															

Punch Blanks



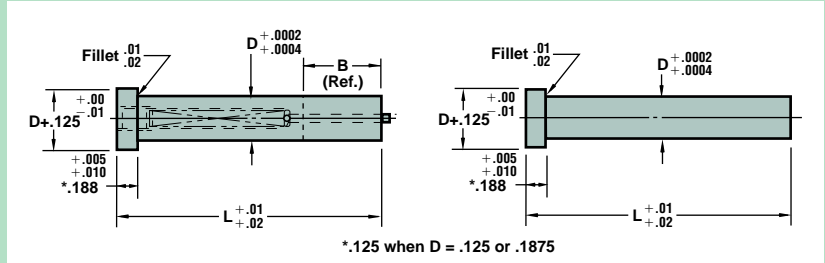
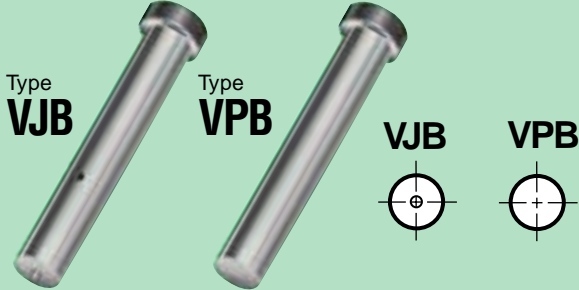
How to Order:

Specify: Quantity
Type
Shank & Length Codes
Steel

4 VJB 50-1020, A2
3 VPB 37-200, M2

Jektol® & Regular

- Steel: A2, M2, D2 Rc 60-63
PS Rc 63-65
- All Heads Drawn to Rc 40-55



	Shank		Point Length B (Ref.)	Overall Length L												Jektol Component	
	D	Code		1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00		4.25
VJB	.1875	*18	.50	0311	1012	1113	1220	1321	2022	2123	2230	2331	3032	3133			J2
	.2500	*25															J3
	.3125	31															J4
	.3750	37															J6
																	J6
	.1875	*18	.75		0312	1013	1120	1221	1322	2023	2130	2231	2332	3033	3140		J2
	.2500	*25															J3
	.3125	31															J4
	.3750	37															J6
	.4375	43															J6
	.5000	50															J6
	.6250	62															J9
.7500	75	J9															
1.0000	100	J9															
	.1875	*18	1.00			0313	1020	1121	1222	1323	2030	2131	2232	2333	3040		J2
	.2500	*25															J3
	.3125	31															J4
	.3750	37															J6
	.4375	43															J6
	.5000	50															J6
	.6250	62															J9
.7500	75	J9															
1.0000	100	J9															
	.2500	*25	1.25				0320	1021	1122	1223	1330	2031	2132	2233	2340		J3
	.3125	31															J4
	.3750	37															J6
	.4375	43															J6
	.5000	50															J6
	.6250	62															J9
	.7500	75															J9
1.0000	100	J9															
	.3125	31	1.50					0321	1022	1123	1230	1331	2032	2133	2240		J4
	.3750	37															J6
	.4375	43															J6
	.5000	50															J6
	.6250	62															J9
	.7500	75															J9
	1.0000	100															J9
VPB	.1250	12	N/A	125	150	175	200	225	250	275	300	325	350	375	400	425	N/A
	.1875	18															
	.2500	25															
	.3125	31															
	.3750	37															
	.4375	43															
	.5000	50															
	.6250	62															
	.7500	75															
	1.0000	100															

*Not available in D2

Solid Matrixes

Precision Press Fit Insert Matrixes

• Steel: A2, M2 Rc 60-63
PS Rc 40-55



Round 1 Day, Shape 2 Days
(18-100 Dia.)
All 125-150 Dia. 3
All 175-275 Dia. 5

Type
VAX



Type
VBX



Type
VN

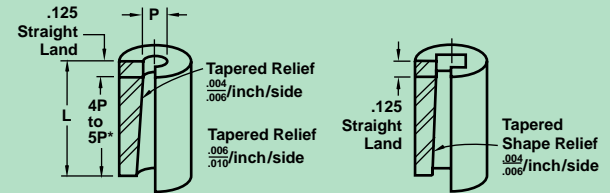


Type
VR



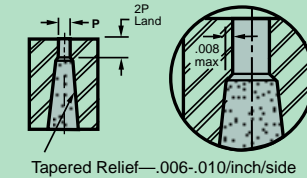
Shown with optional Key Flat. See pages 24 and 25.

Matrix Construction



*3P for holes under .100

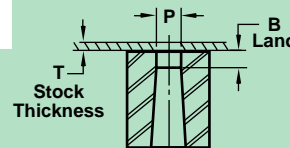
When $P < .062$



Tapered Relief—.006-.010/inch/side

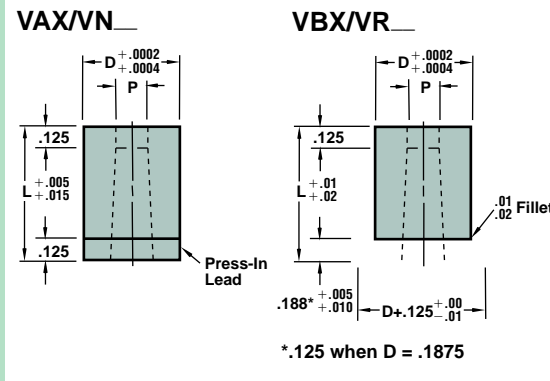
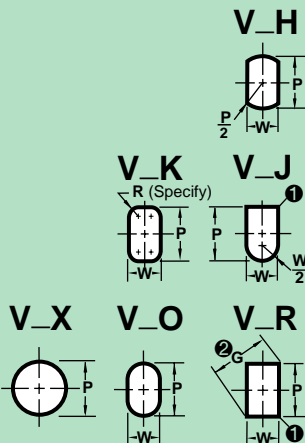
Shortened Matrix Land

To minimize slug jamming in the matrix, the land length should be shortened for stock thicknesses less than .030. (Holes .250 and under.) The shorter land lengths are available at no extra charge but must be specified.



Stock Thickness T	Land Length B
.003-.010	.031
.011-.020	.062
.021-.030	.093

Example $T = .015$
 $VAX 25-50 P.064, B = .062$



P&W Tolerance $\frac{+.0002}{-.0000}$
P to D $\frac{.0003}{\text{circle}}$

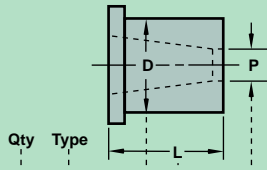
	Body		Round	Shape		Overall Length L						
	D	Code	Range P	Min. W	Max. P/G	.500	.625	.750	.875	1.000	1.125	1.250
VAX/VBX VN/VR	.1875	18	.038- .130	.050-	.130							
	.2500	25	.050- .170	.050-	.170	50	62	75	87	100	112	
	.3125	31	.062- .212	.050-	.212							125
	.3750	37	.075- .255	.050-	.255							125
	.4375	43	.130- .297	.075-	.297							
	.5000	50	.150- .344	.075-	.344	50	62					
	.6250	62	.188- .425	.075-	.425			75	87	100	112	125
	.7500	75	.225- .510	.075-	.510							
	.8750	87	.300- .595	.075-	.595							
	1.0000	100	.400- .680	.075-	.680				75	87	100	112
1.2500	125	.500- .850	.075-	.850								
1.5000	150	.600-1.050	.075-	1.050								
A2, M2 Only P&W Tolerance $\frac{+.0004}{-.0000}$ D Tolerance $\frac{+.0002}{+.0006}$ P to D $\frac{.0003}{\text{circle}}$	1.7500	175	.750-1.400	.130-	1.400							
	2.0000	200	.875-1.600	.130-	1.600							
	2.2500	225	1.000-1.800	.130-	1.800			75	87	100	112	125
	2.5000	250	1.125-2.000	.130-	2.000							
	2.7500	275	1.250-2.200	.130-	2.200							

① .007 Max. Fillet (Typical)

② Check your P & W Dimensions to be sure the diagonal G does not exceed the max. shown.

How to Order:

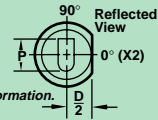
Specify: Quantity
 Type
 Body & Length Codes
 P or P&W Dimension
 Steel
 Standard Alterations



4 VNR 37-112 P.207, W.126, A2, X8
 3 VRO 50-137 P.3125, W.1562, M2, X2

Key Flats

The standard location of a key flat is at 0°.



See pgs. 24 & 25 for more information.

Dayton Slug Control is Easy to Order

Dayton Slug Control is as easy as specifying a catalog number. Add the information that is unique to your application to the matrix catalog number. See the example below:

You must specify **XSC** for alteration, **material thickness** and **clearance per side** as a percent.

Inch	Catalog Number				Your Specs		
	VAX	62-100	P.250		XSC	MT.0125	CS 5
	Type	D	L	P	Alt. Code	Mat'l Th'kness (inches)	Clear Per Side (%)

This information will be entered into our computer to generate a program to alter the land of the matrix and end your slug pulling problems forever! Call us or contact your Dayton distributor for more information.

See inside front of catalog for more information.

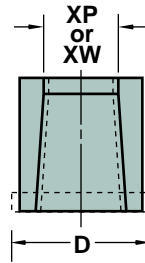
Code	1.375	1.500
18		
25		
31		
37	137	150
43		
50	137	150
62		
75		
87		
100	137	150
125		
150		
175		
200		
225	137	150
250		
275		

Standard Alterations

Standard alterations are the ranges beyond those sizes listed in the catalog which can be manufactured for a slight additional charge. Does not add to delivery unless noted.

XP, XW

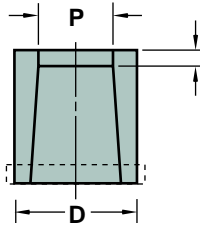
P & W Dimensions Larger than Standard.



Body Code	Max P/G
18	.130
25	.190
31	.240
37	.290
43	.340
50	.390
62	.500
75	.600
87	.700
100	.800
125	1.000
150	1.200

XB

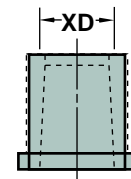
Land Length Shorter or Longer than Standard



Rounds	
Hole Range	Max B
.0310-.0620	2P
.0621-.0930	.187
.0931-.1580	.250
.1581-.2350	.312
.2351-.3000	.375
.3001-.4000	.437
.4001-Over	.500

XD

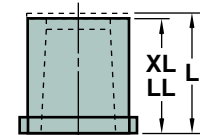
Reduced Body Dia.
 Head dia. does not change with body reduction.



Body Code	Min XD	Max P/G
18	.126	.076
25	.188	.130
31	.251	.190
37	.313	.240
43	.376	.290
50	.438	.340
62	.562	.437
75	.688	.550
87	.813	.650
100	.938	.750
125	1.188	.950
150	1.438	1.150

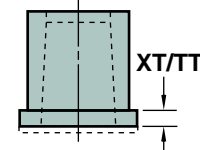


XSC Slug Control eliminates slug pulling
 (See order example at left.)



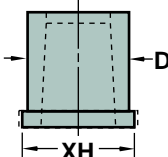
XL Overall Length Shortened
 Min. overall length: Headless = .50
 Headed = .50 + T

LL Precision Overall Length
 Same as XL except overall length is held to ± .001.



XT Thinner Head than Standard
 Stock removal from head end which shortens overall length.

TT Precision Head Thickness
 Same as XT except head thickness tolerance is held to ± .0005



XH Reduced Head Diameter
 Minimum head diameter equals D + .000 - .001

XN DayTride® A unique wear-resistant surface treatment for M2 & PS only.
 + 2 Days

Split Matrixes

Precision Press Fit Insert Matrixes

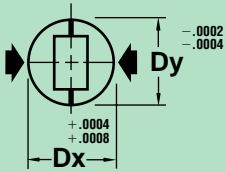
• Steel: A2, M2 Rc 60-63



18-150 Dia. 3 Days
175-275 Dia. 5 Days



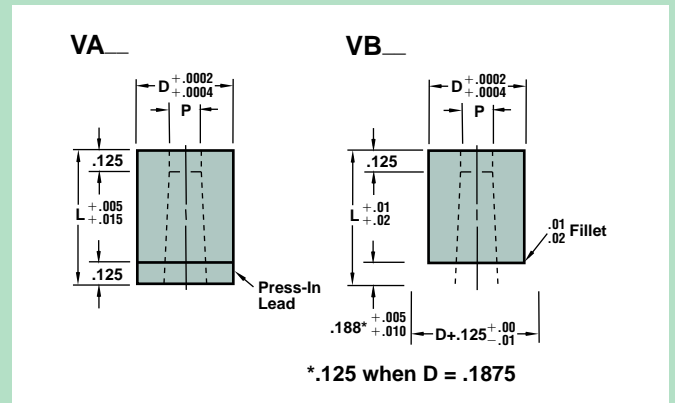
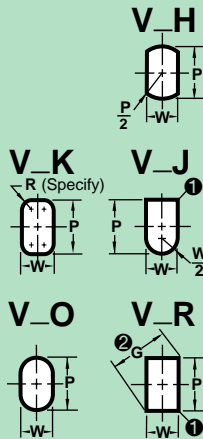
Shown with optional Key Flat. See pages 24 and 25.



Non-Separating Split

Dayton's Splits are engineered with a diametrical difference. This produces a pre-load which permanently seals the split after installation.
Pat. No. 3,166,359

P&W Tolerance $+.0002$ to $-.0000$
P to D $.0003$



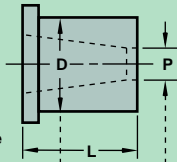
Body		Shape Max. P/G	Overall Length L							
D	Code		.500	.625	.750	.875	1.000	1.125	1.250	1.375
.1875	18	.130								
.2500	25	.170	50	62	75	87	100	112		
.3125	31	.212							125	
.3750	37	.255								
.4375	43	.297	50	62	75	87	100	112	125	137
.5000	50	.344								
.6250	62	.425								
.7500	75	.510			75	87	100	112	125	137
1.0000	100	.680								
1.2500	125	.850								
1.5000	150	1.050			75	87	100	112	125	137
1.7500	175	1.400								
2.0000	200	1.600			75		100		125	
2.2500	225	1.800								

① .007 Max. Fillet (Typical)

② Check your P & W Dimensions to be sure the diagonal G does not exceed the max. shown.

How to Order:

- Specify: Quantity
- Type
- Body & Length Codes
- P or P&W Dimension
- Steel
- Standard Alterations



Qty Type

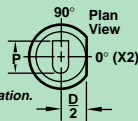
3 VAO 18- 62 P.118, W.091, M2, X2

3 VBR 50- 112 P.2975, W.1487, A2, X2

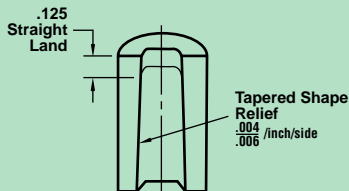
Key Flats

The standard location of a key flat is at 0°.

See pgs. 24 & 25 for more information.



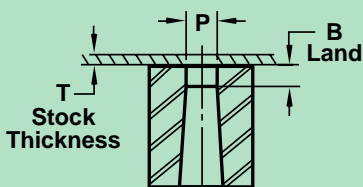
Matrix Construction
Split Matrix Shapes



The Hole Shape is precision ground for the entire length of the Matrix, including the tapered shape relief.

Shortened Matrix Land

To minimize slug jamming in the matrix, the land length should be shortened for stock thicknesses less than .030. (Holes .250 and under.)



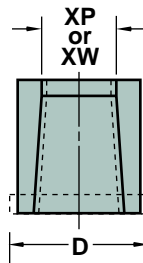
Mfg under U.S. Pat. No. 3,166,359 and various Foreign Pat. & Pat. Pend.

Standard Alterations

Standard alterations are the ranges beyond those sizes listed in the catalog which can be manufactured for a slight additional charge. Does not add to delivery unless noted.

XP, XW

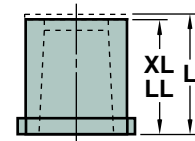
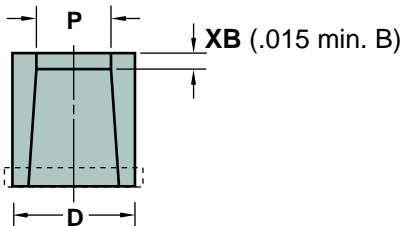
P & W Dimensions Larger than Standard. No Minimum W



Body Code	Max P/G
18	.130
25	.190
31	.240
37	.290
43	.340
50	.390
62	.500
75	.600
100	.800
125	1.000
150	1.200

XB

Land Length Shorter or Longer than Standard.



XL

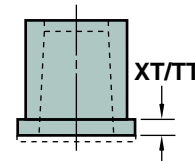
Overall Length Shortened

Min. overall length: Headless = .50
Headed = .50 + T

LL

Precision Overall Length

Same as XL except overall length is held to ± .001.



XT

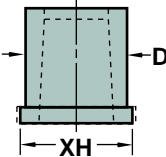
Thinner Head than Standard

Stock removal from head end which shortens overall length.

TT

Precision Head Thickness

Same as XT except head thickness tolerance is held to ±.0005



XH

Reduced Head Diameter

Minimum head diameter equals D + .000 - .001

XN
+ 2 Days

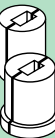
DayTride® A unique wear-resistant surface treatment for M2 & PS only.

The shorter land lengths are available at no extra charge but must be specified.

How to Specify: Add Land Length to Catalog Number.

Stock Thickness T	Land Length B
.003-.010	.031
.011-.020	.062
.021-.030	.093

Example: (T = .015)
VBO 25-50, P.064, W.031, B = .062



Guide Bushings

Solid Construction

• Steel: A2, Rc 60-63

FDS
Round 1 Day, Shape 2 Days

How to Order:

Specify: Quantity
Type
Body & Length Codes
P or P&W Dimension
Steel

Application Data: Guide Bushings should be ordered a minimum of .0005 larger than the punch point diameter with which they are to be used.



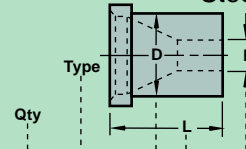
Type
VG__



Type
VF__



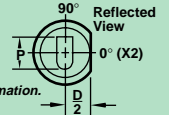
Type
VE__



- 4 VEX 37-62 P.146, A2
- 2 VFO 50-50 P.250, W.062, A2
- 3 VGR 43-50 P.243, W.090, A2, X2

Key Flats

The standard location of a key flat is at 0°.



See pgs. 24 & 25 for more information.

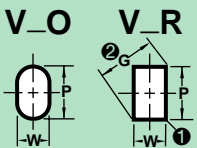
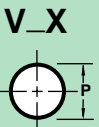
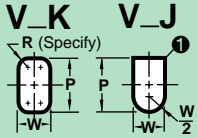
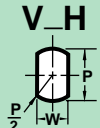
Guide Bushing Alterations

Product	Rounds	Shapes
XH	•	•
XP	•	
XT	•	•
TT	•	•

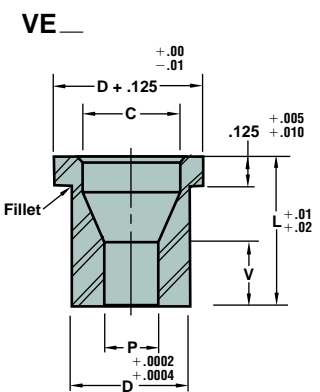
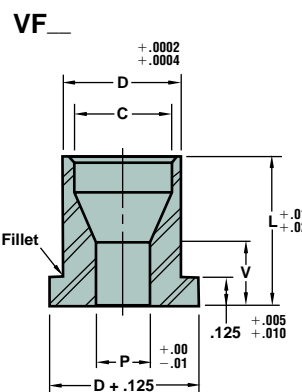
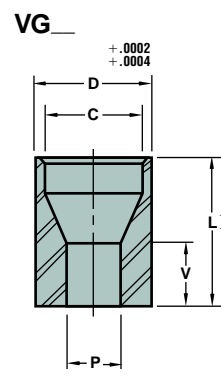
See page 13 for an explanation of these alterations

Guide Chart

Hole Range P or G	Land Length V
Up to .0650	2P
.0651-.0950	P + .065
.0951-.4250	.82P + .082



P&W Tolerance
P to D $\begin{matrix} +.0002 \\ -.0000 \end{matrix}$ $\begin{matrix} \text{C} \\ \text{C} \end{matrix}$



	Body		Round	Shape	C'Bore Dia. C	Overall Length L			
	D	Code	Range P	Min. Max. W P/G		.3125	.375	.500	.625
Headless VG __	.1875	18	.062-.130	.050-.130	.141	31			
	.2500	25	.062-.170	.050-.170	.201				
	.3125	31	.093-.212	.050-.212	.261		37		
	.3750	37	.125-.255	.050-.255	.323			50	62
	.4375	43	.187-.297	.075-.297	.386				
	.5000	50	.212-.344	.075-.344	.448				
	.6250	62	.293-.425	.075-.425	-				
Head Down VF __	.1875	18	.062-.130	.050-.130	.141	31			
	.2500	25	.062-.170	.050-.170	.201				
	.3125	31	.093-.212	.050-.212	.261		37		
	.3750	37	.125-.255	.050-.255	.323			50	62
	.4375	43	.187-.297	.075-.297	.386				
	.5000	50	.212-.344	.075-.344	.448				
	.6250	62	.293-.425	.075-.425	-				
Head Up VE __	.1875	18	.062-.130	.050-.130	.141	31			
	.2500	25	.062-.170	.050-.170	.201				
	.3125	31	.093-.212	.050-.212	.261		37		
	.3750	37	.125-.255	.050-.255	.323			50	62
	.4375	43	.187-.297	.075-.297	.386				
	.5000	50	.212-.344	.075-.344	.448				
	.6250	62	.293-.425	.075-.425	-				

① .007 Max. Fillet (Typical)

② Check your P & W Dimensions to be sure the diagonal G does not exceed the max. shown.

Extended Range Punches

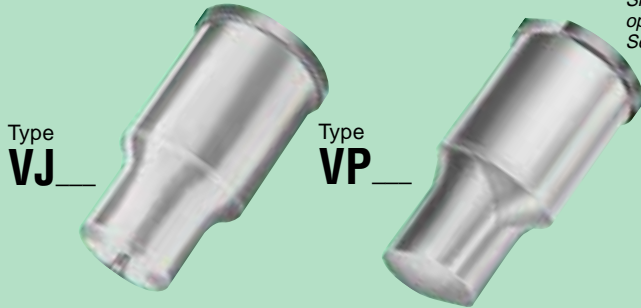
• Steel: A2, Rc 60-63



How to Order:

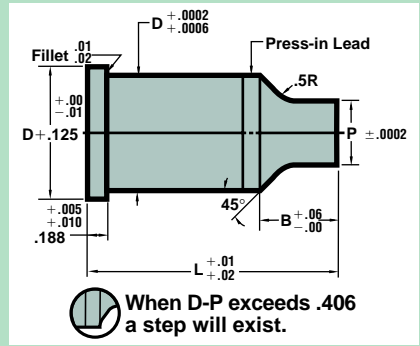
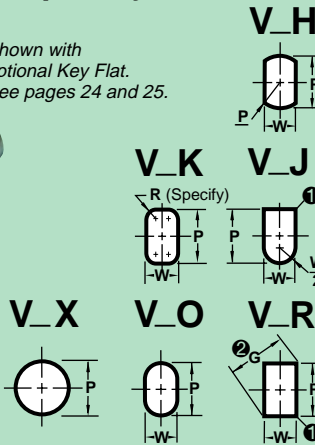
Specify: Quantity
Type
Shank & Length Codes
P or P&W Dimensions
Steel

3 VPR 200-1021 P1.206, W.582, A2



P&W Tolerance $\pm .0002$
P to D $.0005$

Shown with optional Key Flat. See pages 24 and 25.



Shank		Point Length B	Round Range P	Shape		Overall Length L				
D	Code			Min. W	Max P/G	2.25	2.50	2.75	3.00	3.25
1.250	125	1.25	.625-1.2499	.282-1.2500	1021	1122	1223	1330		
1.500	150		.750-1.4999	.300-1.5000						
1.750	175		1.000-1.7499	.350-1.7500						
2.000	200		1.187-1.9999	.400-2.0000						
2.250	225		1.375-2.2499	.450-2.2500						
2.500	250		1.625-2.4999	.500-2.5000						
1.250	125	1.50	.625-1.2499	.282-1.2500		1022	1123	1230	1331	
1.500	150		.750-1.4999	.300-1.5000						
1.750	175		1.000-1.7499	.350-1.7500						
2.000	200		1.187-1.9999	.400-2.0000						
2.250	225		1.375-2.2499	.450-2.2500						
2.500	250		1.625-2.4999	.500-2.5000						

Rectangular Matrixes

• Steel: M2 Rc 60-63



How to Order:

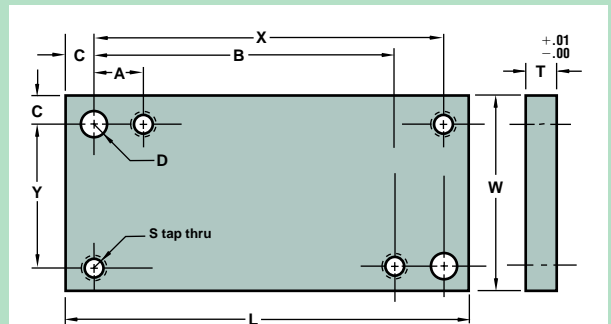
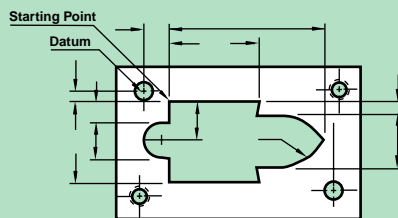
Specify: Quantity
Type
Size & Thickness

1 VSS 1020-37 PER PRINT



Type VSS

Tolerance
Shape $\pm .0002$
Location from Datum
Starting Point $\pm .0003$
Dowel Holes $\pm .0002$
Screw Holes $\pm .005$



Outside Dimensions		Thickness T				Screw and Dowel Locations						
W x L	Code	.312	.375	.500	.625	A	B	X	Y	C	D	S
1.00 X 2.00	1020							1.5000	.5000	.250	.2500	10-32
1.50 X 3.00	1530							2.5000	1.0000	.250	.2500	10-32
2.00 X 4.00	2040	31	37			.500	3.000	3.5000	1.5000	.250	.2500	10-32
2.00 x 5.00	2050					.500	4.000	4.5000	1.5000	.250	.2500	10-32
3.00 x 6.00	3060			50		.500	5.000	5.5000	2.5000	.250	.2500	10-32
4.00 x 7.00	4070					.750	5.500	6.2500	3.2500	.375	.3750	5/16-18
5.00 x 9.00	5090				62	.750	7.500	8.2500	4.2500	.375	.3750	5/16-18

1 Sharp corners are typical. To assure proper clearance, Dayton will provide standard broken corners to eliminate interference with matrix fillet when total clearance is .005 or less.

2 Check your P & W Dimensions to be sure the diagonal G does not exceed the max. shown.

CloSPACE Punches

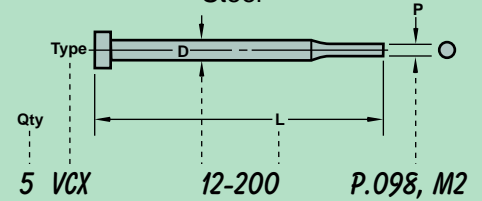
For Precision Closed Space Holes

- Steel: A2, M2 Rc 60-63
- VXX, VCX, VCB Heads Drawn to Rc 40-55

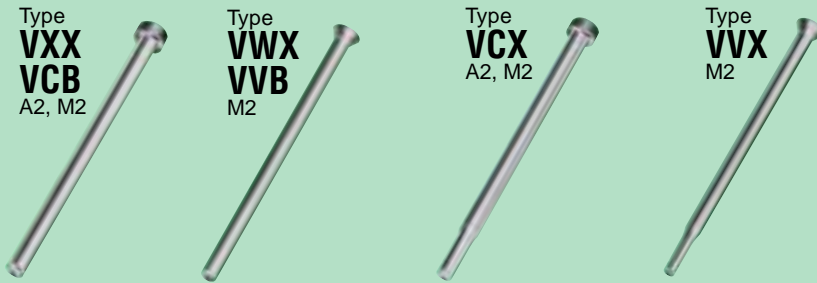


How to Order:

Specify: Quantity
Type
Shank & Length Codes
P Dimension
Steel



P Tolerance $\begin{matrix} +.0002 \\ -.0000 \end{matrix}$
P to D $\begin{matrix} .0003 \\ \text{©} \end{matrix}$



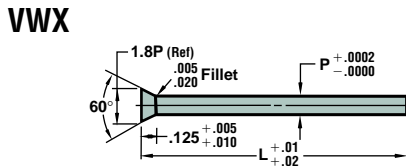
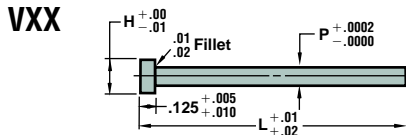
CloSPACE Punch Alterations

Product	VXX	VWX	VCX	VVX	VCB	VVB
XB			•	•		
XD			•			
XH	•				•	
XL	•	•	•	•	•	•
LL	•	•	•	•	•	•
XP				•		
XT	•		•		•	
TT	•		•		•	
+2 Days XN*	•	•	•	•	•	•
+4 Days XNT*	•	•	•	•	•	•

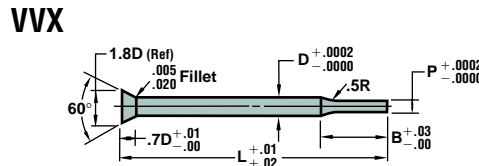
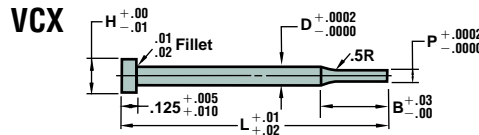
*Available on M2 only.

See page 5 for an explanation of these alterations.

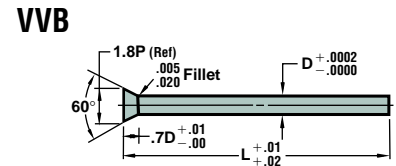
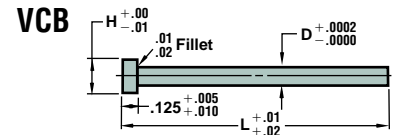
Straight Punches



Regular Punches



Punch Blanks



	Shank		Head Dia. H	Point Length B	Range P	Overall Length L				
	D	Code				1.50	1.75	2.00	2.25	2.50
Straight Punches VWX VXX	N/A	N/A	.125	N/A	.0300-.0630	150	175	200	225	250
			.160		.0631-.0940					
			.190		.0941-.1250					
			.220		.1251-.1570					
			.250		.1571-.1800					
			.282		.1881-.2190					
			.313		.2191-.2500					
Regular Punches VVX VCX	N/A	N/A	.0625	.19	.0310-.0624	150	175	200	225	250
			.0938	.25	.0626-.0937					
			.1250	.31	.0939-.1249					
			.1562	.31	.1251-.1561					
			.1875	.31	.1563-.1874					
			.2188	.31	.1876-.2187					
			.2500	.31	.2189-.2499					
Punch Blanks VVB VCB	N/A	N/A	.0625	N/A		150	175	200	225	250
			.0938							
			.1250							
			.1562							
			.1875							
			.2188							
			.2500							

Quill Bushings/Guides



How to Order:

Specify: Quantity
Type
Body & Length Codes
Material

Matched Quill Sets

Ideal for small hole applications where risk of punch breakage is extremely high and replacement costs must be lowest.

Perfect Alignment

Ground bearings at both ends of the Quill Bushing assure precise punch-to-bushing alignment. This eliminates the bending influence of unrelieved bushing holes which are difficult to produce straight.

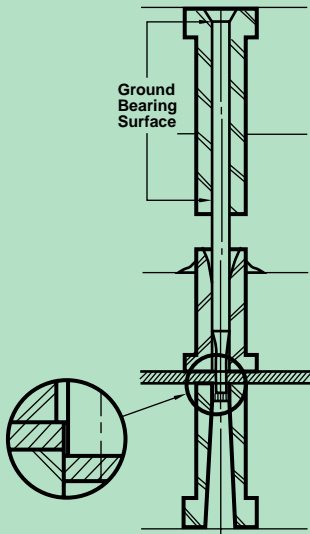
Dayton's .002 to .003 relief per side between bearing surfaces completely eliminates the problem.

No Risk of Stock Distortion

During stripping, the punch tends to pull the stock into the stripper void, and may cause part distortion.

Dayton's controlled limit (.015 per side max.) eliminates the distortion potential for almost any application.

Distortion cannot occur when the space between the guide and the punch $[(.5(D-P))]$ is less than stock thickness.



3 VQX 31-75, A2

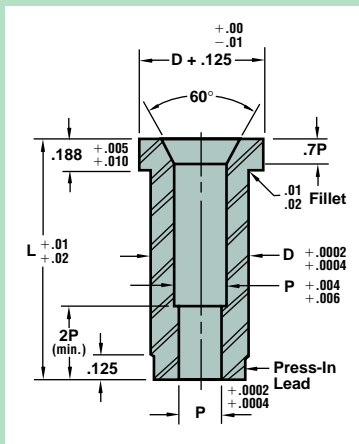
4 VFQ 31-75, BEARING BRONZE

Quill Bushing Alterations

- XD** Reduced Shank Diameter
- XH** Reduced Head Diameter
- XL** Overall Length Shortened
- XP** P Dimensions Larger than Standard

Limitations

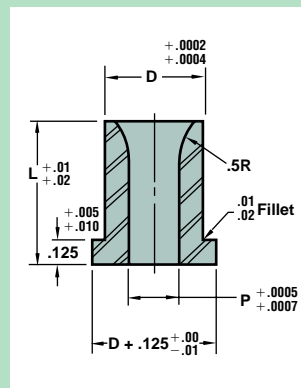
Body Code	XP		XD	
	Min. P	Max. P	Min. XD	Max. P
18	.0625	.094	.126	.0625
25	.0625	.125	.188	.0938
31	.0625	.156	.251	.1250
37	.0625	.188	.313	.1562
43	.0625	.219	.376	.1875



A2 Rc 60-63



Type VQX



Complete with halo washer that provides a head at both ends.

Type VFQ Bearing Bronze

No alterations available on VFQ.

	Body		Punch Hole P	Overall Length L				
	D	Code		.500	.625	.750	1.000	1.250
VQX Press Fit Quill Bushings	.1875	18	.0625					
	.2500	25	.0938					
	.3125	31	.1250			75	100	125
	.3750	37	.1562					
	.4375	43	.1875					
VFQ Quill Guide Bushings	.1875	18	.0625	50				
	.2500	25	.0938		62			
	.3125	31	.1250					
	.3750	37	.1562			75		
	.4375	43	.1875					

Micro Guides/Matrixes

• Steel: A2 Hardened & Drawn
A2 Rc 60-63



How to Order:

Specify: Quantity
Type
Body & Length Codes
P Dimension
Steel

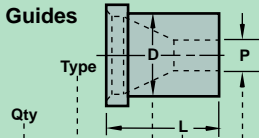


Guide/Matrix Alterations

Product	Headless Guides/Matrixes	Headed Guides/Matrixes
XH		•
XL	•	
XP	•	•
XT		•
TT		•

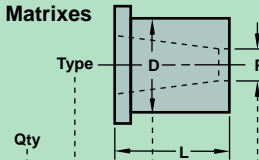
See page 13 for an explanation of these alterations

Guides



- Qty
- 3 MEX 18-31 P.062, A2
 - 3 MGX 12-31 P.044, A2
 - 2 MFX 12-31 P.057, A2

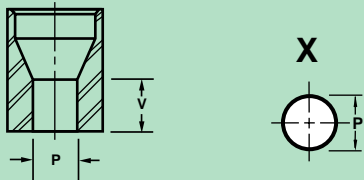
Matrixes



- Qty
- 3 MHX 18-37 P.060, A2
 - 2 MDX 12-31 P.045, A2

Guides

Matrixes



*Guide Chart

Hole Range P	Land Length V
Up to .0650	2P
.0651-.0950	P + .065
.0951-.1300	.82P + .082

P Tolerance $\begin{matrix} +.0002 \\ -.0000 \end{matrix}$
P to D $\begin{matrix} .0003 \\ \text{C} \end{matrix}$

	Body		Range P	C'Bore Dia. C	Overall Length L			
	D	Code			.250	.3125	.375	.500
MGX Headless Guide	.1250	12	.031-.062	.076	25	31	37	
	.1875	18	.046-.130	.141		31	37	
MFX Head-Down Guide	.1250	12	.031-.062	.076		31	37	
	.1875	18	.046-.130	.141		31	37	
MEX Head-Up Guide	.1250	12	.031-.062	.076		31	37	
	.1875	18	.046-.130	.141		31	37	
MDX Headless Matrix	.1250	12	.031-.062	N/A		31	37	50
	.1875	18	.046-.130	N/A		31	37	50
MHX Headed Matrix	.1250	12	.031-.062	N/A		31	37	50
	.1875	18	.046-.130	N/A		31	37	50

Misfeed Detectors



With Actuator Rods

• Steel: A2 Rc 60-63



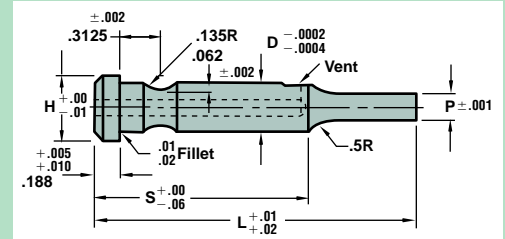
Type
VMX

How to Order:

Specify: Quantity
Type
Shank & Length Codes
P Dimension

3 VMX 37-X287 P.225

3 VMX 50-Z362 P.400, XL3.438



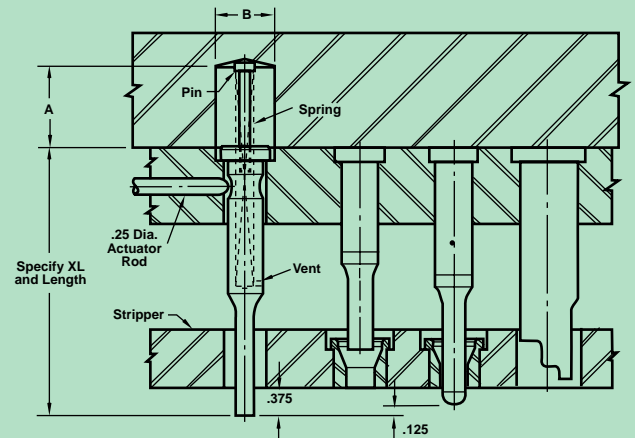
Misfeed Detectors are engineered to extend .375 beyond the stripper and .125 beyond standard VPT pilots. However, shorter lengths can be specified by adding XL and the dimension.

Detectors are furnished with a spring, spring pin and a 6 inch long actuator rod which may be altered to suit customer electrical design.

Application Data

Misfeed Detector senses out-of-register position of stock, and actuates switch to cut-off electrical power to the press.

The Detector Point diameter is usually .025 to .030 smaller than the hole to be probed.

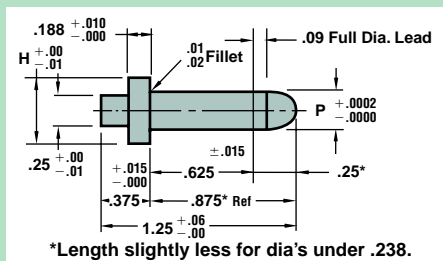


Shank		Range P	Head Dia. H	Overall Length L							Spring Pocket	
Length S	Dia. D			2.375	2.625	2.875	3.125	3.375	3.625	3.875	A	B
1.50 Code X	.375	.090-.375	.500	37-X237	37-X262	37-X287	37-X312	37-X337			1.15	.53
	.500	.375-.500	.625	50-X237	50-X262	50-X287	50-X312	50-X337				.65
1.75 Code Y	.375	.090-.375	.500		37-Y262	37-Y287	37-Y312	37-Y337	37-Y362		.90	.53
	.500	.375-.500	.625		50-Y262	50-Y287	50-Y312	50-Y337	50-Y362			.65
2.00 Code Z	.375	.090-.375	.500			37-Z287	37-Z312	37-Z337	37-Z362	37-Z387	.65	.53
	.500	.375-.500	.625			50-Z287	50-Z312	50-Z337	50-Z362	50-Z387		.65

Spring Pilots

With Parabolic Point Shapes

• Steel: A2 Rc 60-63



*Length slightly less for dia's under .238.



Type
VLX

How to Order:

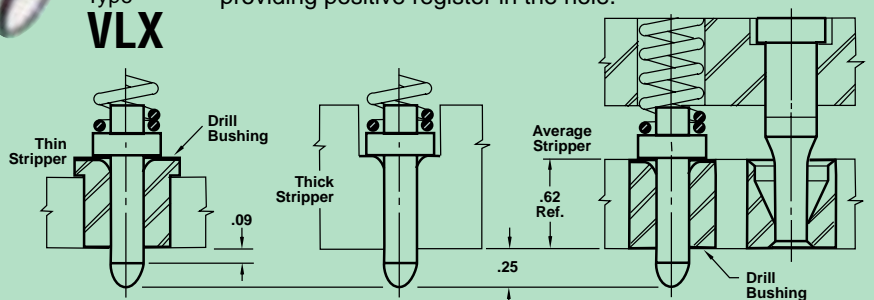
Specify: Quantity
Type
Shank & Length Codes
P Dimension

2 VLX 50 P.156

Precision Pilots for spring-loaded stripper applications. Permits full length feed when starting stock in progressive punching, notching and blanking dies.

Application Data

The parabolic point shape develops a smoothly curved surface providing positive register in the hole.



Catalog Number	Range P	Head Dia. H
VLX-50	.124-.2499	.500
VLX-62	.250-.3749	.625
VLX-75	.375-.5000	.750

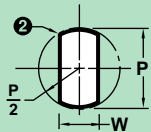
Classified Shapes

- Simplified Specification
- 83 Common Shapes
- No Detailing Required

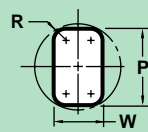
Classified shapes available on solid matrixes.
Split Matrixes available as specials.

Flatted Rounds

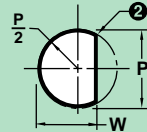
C10**



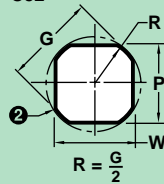
C11**



C33

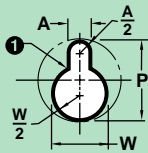


C52

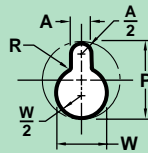


Mono Lobes

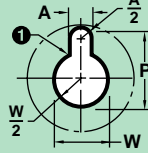
C13



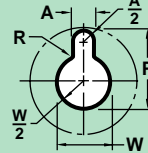
C53



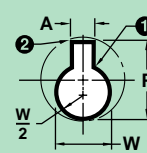
C54



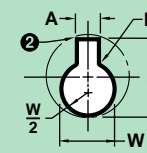
C55



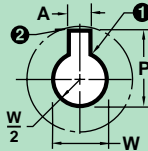
C14



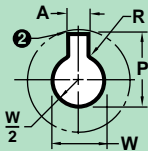
C56



C57



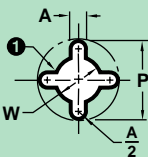
C58



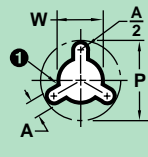
180°

Multi Lobes

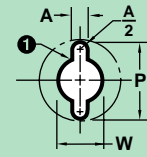
C17



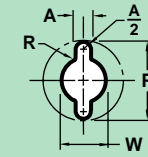
C18



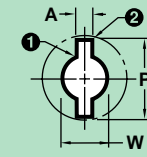
C19



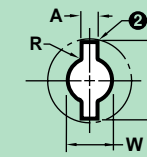
C59



C20

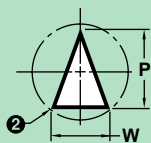


C60

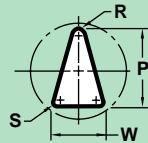


Triangles/Trapezoids

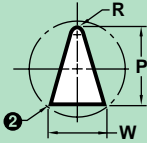
C22+*



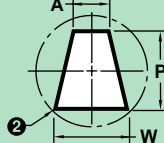
C23



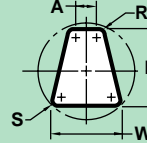
C24*



C25*



C26

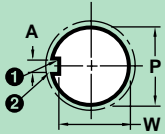


**Indicates standard shapes in Versatile.

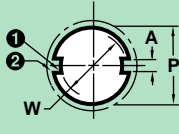
Keys

90°

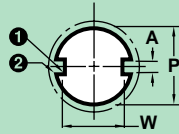
C30



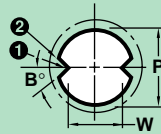
C31



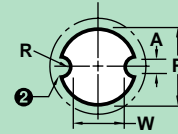
C32



C61*

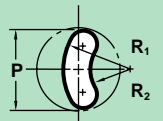


C62

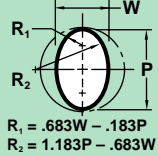


Miscellaneous

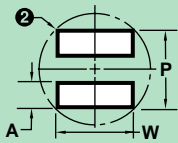
C40



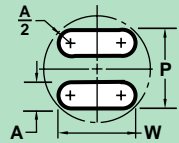
C41



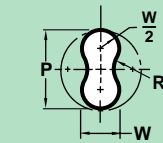
C42*



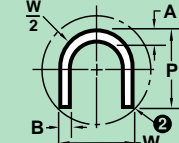
C43



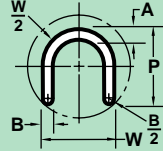
C93



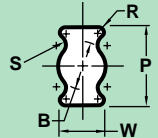
C64



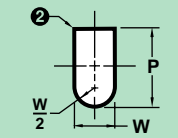
C65*



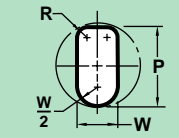
C27



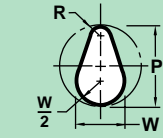
C28**



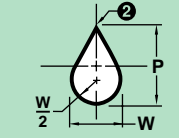
C29



C16

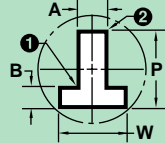


C34+*

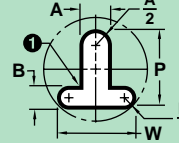


T's

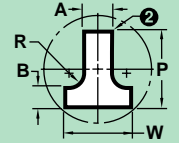
C44



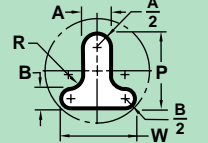
C66



C45

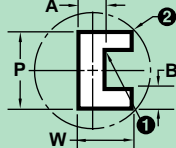


C67

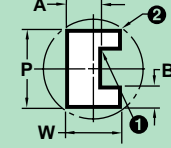


U's

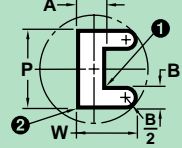
C50



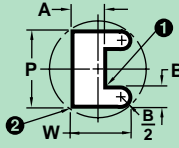
C68



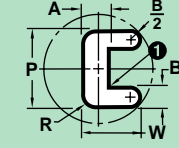
C69



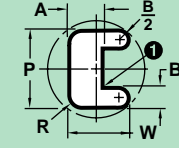
C70



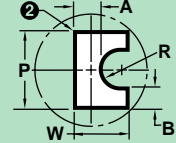
C71



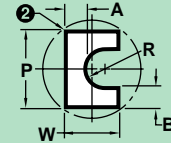
C72



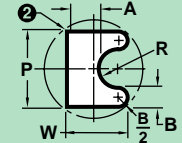
C51



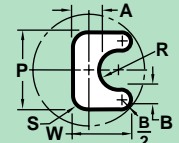
C73



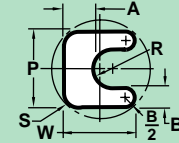
C74



C75

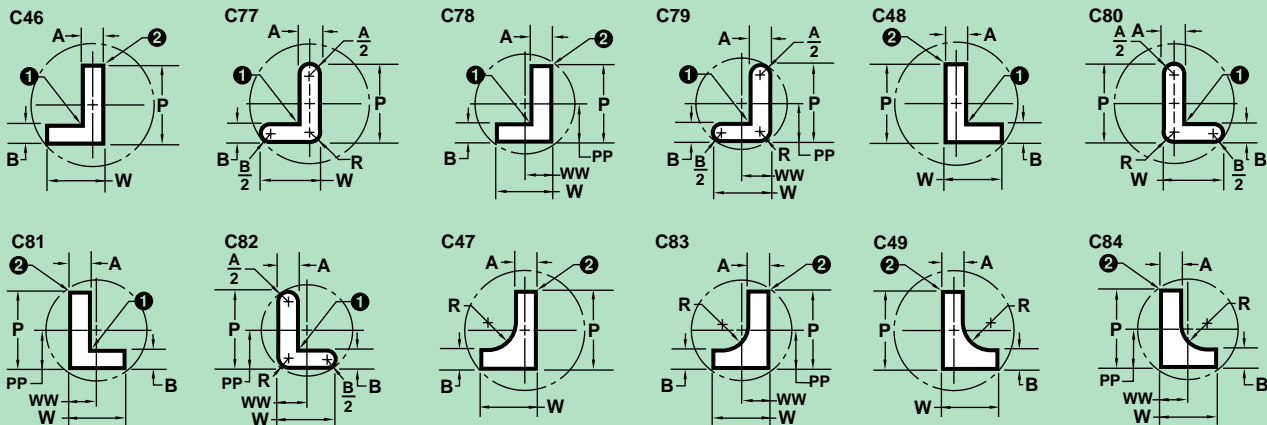


C76

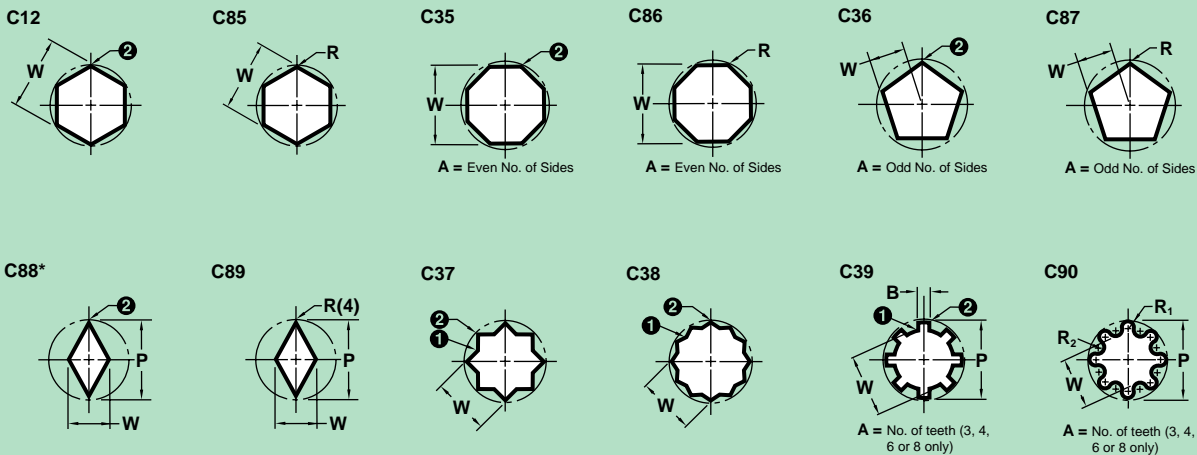


270°

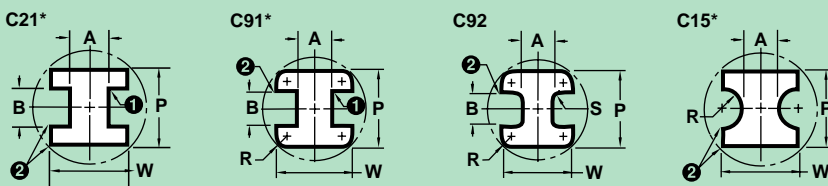
L's



Polygons



Duo Tees



+ Shape Center

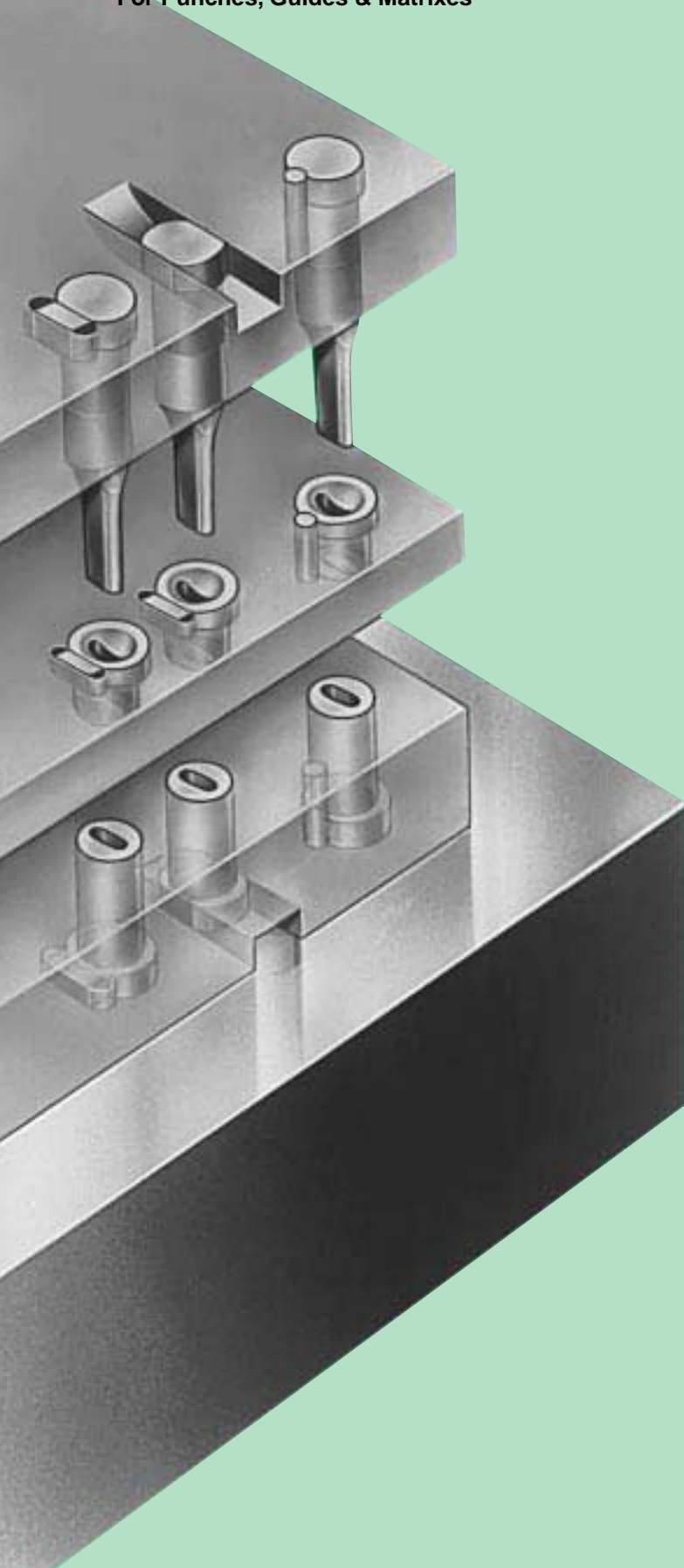
Shapes are centered on punch shanks as shown. Shapes in guide bushings and marixes are also centered as shown with the exception of shapes C22 and C34. Due to clearance, the P dimension on these shapes will not be centered.

*Corner Dimensions

Dimensions should be to the theoretical sharp corners for shapes C22, C24, C34, C61 and C88. Some reduction of these dimensions will result from fitting the punch and matrix under conditions where clearance is .0025 or less per side.

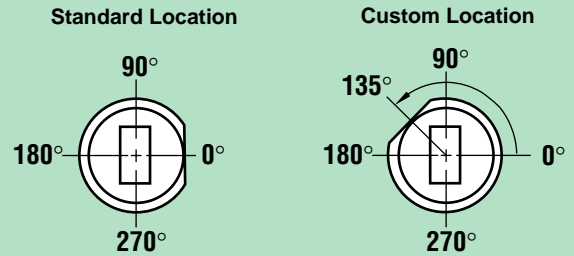
Locking Devices

For Punches, Guides & Matrixes



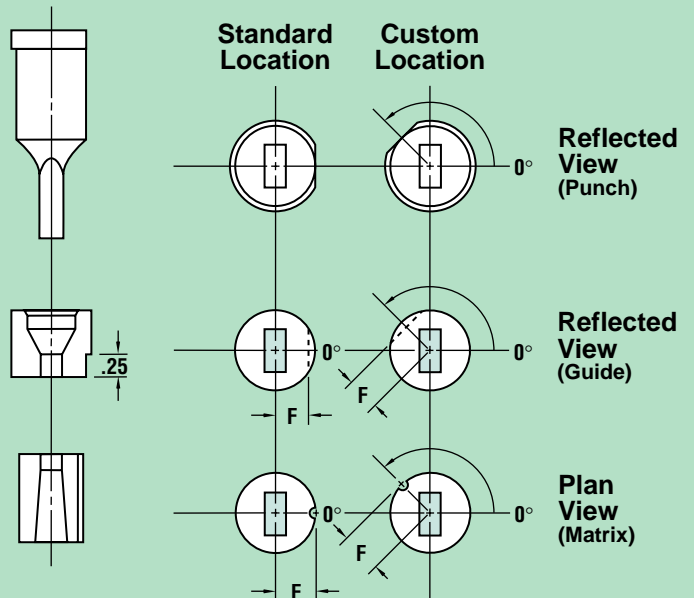
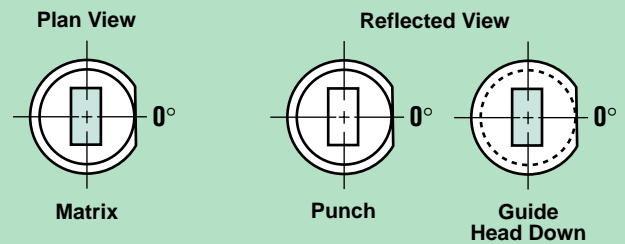
Orientation

The standard location for all locking devices is 0° and is always on the long side (P) of the shape. Custom locations are measured counterclockwise from 0°.



Views

A Plan View is used for the matrix and a Reflected View is used for the punch or guide. The Reflected View, a mirror image (see Ordering Information Section on previous page), simplifies orientation...all locking devices are in the same position.



How to Specify

The most common locking devices, flat, double flat and dowel are available. Select the type then add the code to the component descriptions shown to the right.

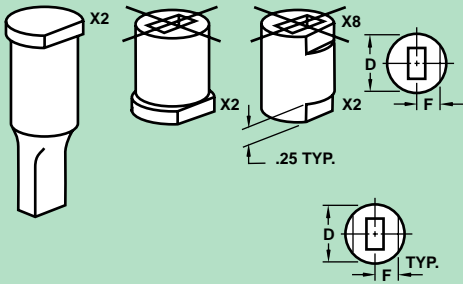
How to Order

- 1 VJJ 37-0312 P.321, W.189, A2, X2
- 3 VR0 50-137 P.3125, W.1562, M2, X3

Location Tolerance

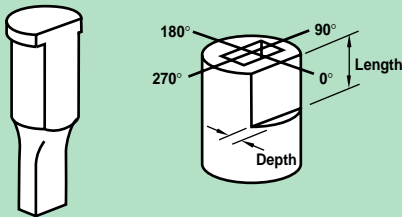
Flat		Dowel	
F	Radial	F	Radial
+ .0002	.0005/ inch	+ .0002	0°2'
- .0000		- .0000	

Flats



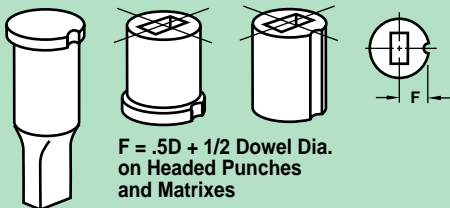
F Dimension (.5D on Headed Products)
Headless Matrixes and Guides

Body Dia.	18	25	31	37	43	50
F	.080	.110	.135	.165	.190	.220
Body Dia.	62	75	87	100	125	150
F	.270	.325	.380	.435	.540	.650
Body Dia.	175	200	225	250	275	
F	.775	.900	1.025	1.150	1.275	



Note: depth of flat is taken from shank, not the head on punches

Dowel Slots



F = .5D + 1/2 Dowel Dia.
on Headed Punches
and Matrixes

Key Flats vs. Dowel Slots

Maximum hole dimensions in matrixes were designed with key flats in mind. There are instances where, if using a dowel slot, the dowel hole could break into the relief hole. For this reason there are two ways to specify the location of the dowel. **X0** (standard/alternate location) and **X1** (custom location) are located .5D from centerline. However, when hole dimensions are approaching the high limit of "P" **X4** (standard /alternate

Standard and Alternate Locations

Definitions:

Standard Location is at 0°.

Alternate Location is 90°, 180° or 270°.

Alternate Locations are available at no additional charge.

Single Flats: X2 & X8

Locking Devices	Punches	Matrixes
X2	Top	Bottom
X8	N/A	Top

Order Example:

X2 — 90°

Double Flats: X3

Locking Devices	Punches	Matrixes
X3	Top	Bottom

Order Example:

X3 — 90°

Second Flat is *always parallel* to the first flat.

Additional Flats

Code	Depth	Length
X81	.060	.500
X82	.060	.625
X83	.060	.750
X84	.060	Full Length
X85	.093	.500
X86	.093	.625
X87	.093	.750
X88	.093	Full Length
X89		Specify Dimensions

Dowel Slots: X0, X4 & X41

Locking Devices	Dowel Dia.
X0	.125
X4	.125
X41	.1875

Order Example:

X0 — 180°

F Dimension
for Headless Matrixes Only

Body Dia.	25	31	37	43	50	62-275
X0	.1250	.1562	.1875	.2188	.2500	.5D
X4 F	.1625	.1875	.2125	.2375	.2625	.5D
X11	.1938	.2188	.2438	.2688	.2938	.5D

Custom Locations

Definition:

Custom Location is *any angle other than*: 0°, 90°, 180° or 270°.

Single Flats: X5 & X9

Locking Devices	Punches	Matrixes
X5	Top	Bottom
X9	N/A	Top

Order Example:

X5 — 135°

Double Flats: X6

Locking Devices	Punches	Matrixes
X6	Top	Bottom

Order Example:

X6 — 135°

Additional Flats

Code	Depth	Length
X91	.060	.500
X92	.060	.625
X93	.060	.750
X94	.060	Full Length
X95	.093	.500
X96	.093	.625
X97	.093	.750
X98	.093	Full Length
X99		Specify Dimensions

Dowel Slots: X1, X7 & X71

Locking Devices	Dowel Dia.
X1	.125
X7	.125
X71	.1875

Order Example:

X71 — 135°

F Dimension
for Headless Matrixes Only

Body Dia.	25	31	37	43	50	62-275
X1	.1250	.1562	.1875	.2188	.2500	.5D
X47 F	.1625	.1875	.2125	.2375	.2625	.5D
X71	.1938	.2188	.2438	.2688	.2938	.5D

location) or **X7** (custom location) may be specified. This relocates the dowel outward to assure no interference between the dowel and relief hole. Note, when the matrix diameter is over .500 the centerline dimension is .5D on all dowels.

To determine if you will have an interference problem see Matrix Construction on page 12.

Jektole® Data

The Key to Increased Productivity

Perforating punch to matrix clearances in metal stamping dies have been universally expressed as a percentage of stock thickness, and for clarity should be expressed as percent per side. (Δ = Clearance per side.)

The "old practice" called for $\Delta 5\%$ and is commonly known as Regular Clearance. It has been applied to nearly all applications in perforating ferrous materials.

Jektole, the engineered clearance, is approximately twice Regular clearance $\Delta 10\text{-}12\%$. However, clearances of up to $\Delta 50\%$ are not uncommon on some hard materials. Clearance tests have been performed by DAYTON to prove that increasing the clearance does not lessen hole quality as has been thought by many people. DAYTON Clearance Tests do, in fact, prove that Jektole Clearance provides many advantages and benefits.

JEKTOLE® In Production

- requires less press tonnage
- reduces pressure required to strip the punch...which in turn reduces punch wear
- produces minimal blurr
- doubles (and often triples) piece output per grind
- reduces total punch costs

JEKTOLE® In Maintenance

- Keeper Key — holds pin in retracted position
- eliminates the need for disassembly before grinding
- maintains proper pin extension
- reduces downtime for re-grinding

Standard Jektole Data

DIMENSION	J2	J3	J4	J6	J9	J12
Std. Shank Dia.	D .1875	.2500	.3125	.3750 .4375 .5000	.6250 .7500 1.000	1.250 and larger
Point Hole Dia.	C .020	.032	.046	.063	.094	.125
Shank Hole Dia.	E .086	.109	.141	.172	.221	.275
Pin Extension	.03	.03	.06	.06	.06	.06

Jektole Design Limits

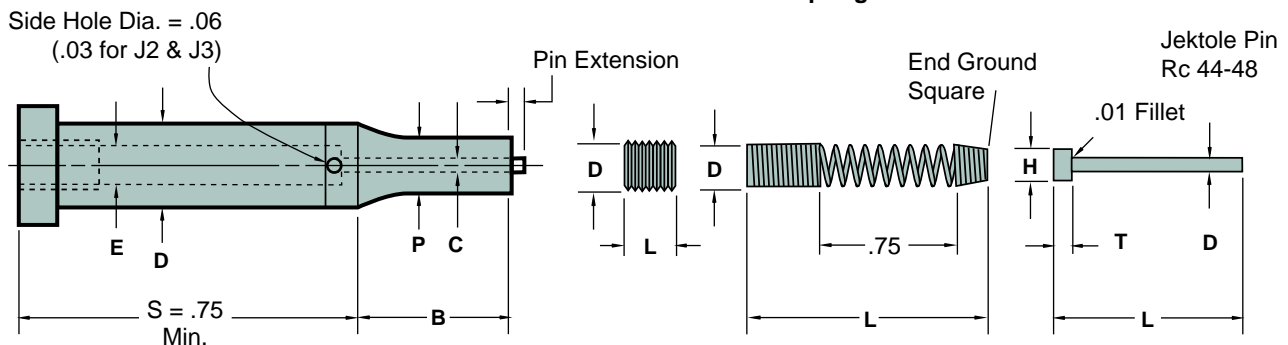
DIMENSION	J2	J3	J4	J6	J9	J12
Min. Shank Dia.	D .172	.218	.282	.344	.442	.552
Min. Point Dia.	P .050	.080	.115	.158	.235	.281
Max. Point Lgth.	B 1.25	1.50	1.62	1.62	1.62	1.62
Max. Shank Lgth.	S 3.375	3.375	3.375	4.25	4.25	2.75

Universal Jektole Components

EJECTOR PINS	J2	J3	J4	J6	J9	J12
Overall Length	L 1.11	1.38	1.94	1.94	2.22	2.22
Pin Diameter	D .017	.027	.041	.058	.089	.120
Head Diameter	H .048	.073	.094	.120	.156	.188
Head Thickness	T .031	.047	.062	.062	.094	.094
SPRINGS	J2	J3	J4	J6	J9	J12
Outside Dia.	D .081	.104	.136	.167	.216	.270
Free Length	L 2.38	2.38	3.19	3.00	3.03	2.56
Pressure (.12" Pre-load)	Lbs. .5	.75	1	1.5	2	2.5
SCREWS	J2	J3	J4	J6	J9	J12
Screw Size	D #3-48	#5-50	#8-32	#10-32	1/4-28	5/16-24
Screw Length	L .19	.19	.19	.19	.25	.25

Jektole® Components

Side Hole Dia. = .06
(.03 for J2 & J3)



Ordering Information

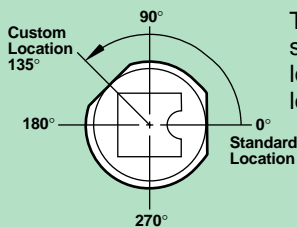
Views

Views are...Reflected View of Punch and Guide; Plan View of Matrix...see opposite column.

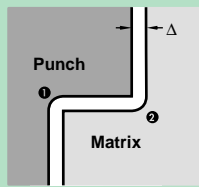
Split-Line

The split-line of Matrixes and Guides is the 90°-270° \mathcal{C} .

Orientation and Locking



The Locking Device orientation is standard at 0°. For types of locking methods and custom locations see pages 24 and 25.



Normal grinding methods produce:

- ① .007 max fillet on the punch... matching corner sharp on the matrix.
- ② .007 max fillet on the matrix... matching corner sharp on the punch.

Notes ① and ② — Fillets and Sharp Corners

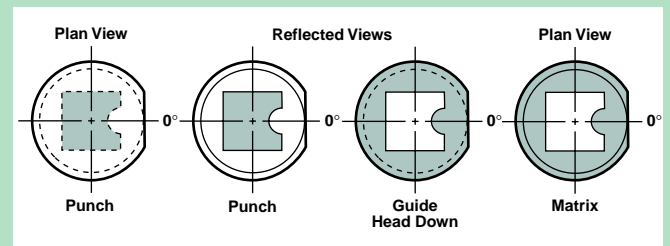
Fillets matched with sharp corners reduces the clearance per side (Δ). If the clearance is .0025 Δ or less, Dayton will break sharp corners when the punches and/or guides and matrixes are ordered together.

This reduces assembly time and the risk of edge breaking during operation.

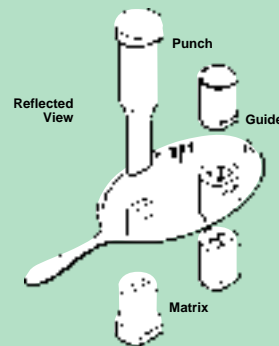
Reflected View — Punches and Guides

The Reflected View is used for Punches and Guides. It is the view as seen in a mirror held below a punch or guide in its operating position.

It is the same as a Plan View from the head end, in which the point shape is shown dotted except a Reflected View is shown with solid line.



The Reflected View simplifies design...eliminates confusion. Shapes on the part print, strip layout, punch, matrix and guide are the same basic view. Orientation for locking devices is the same position on all components.

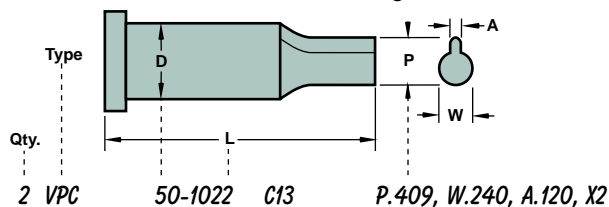


Note: Must identify as REFLECTED VIEW on punch drawing.

How to Order:

Punches

Specify Quantity, Type (change Shape Code to C), Shape Number, Dimensions, Steel and Locking Device.



Matrixes and Guides

To assure proper relationship with punches, it is necessary to specify *punch dimensions* and *clearance per side* (Δ) when ordering matrixes and guides.

Example:

Matrix: 2 VBC 62-100 C13 P.409, W.240, A.120, Δ .002, X2

Guide: 2 VFC 62-62 C13 P.409, W.240, A.120, Δ .0005, X2

Dayton will assure the proper clearance of matrixes and guides to the punch when ordered in this manner.

